# Urban forests for resilient cities

19th EFUF European Forum on Urban Forestry

31 May - 4 June 2016
Ljubljana, Celje
Slovenia

# *Book of Abstracts*

# 19th European Forum on Urban Forestry (EFUF 2016)

## Urban Forests for Resilient Cities

May 31 – June 4, 2016

Ljubljana and Celje, Slovenia

**Book of Abstracts**

http://efuf2016.gozdis.si/

# Organizers and supporters of the EFUF 2016

## Organizers

SLOVENIAN FORESTRY INSTITUTE

Slovenian Forestry Institute

City of Ljubljana

The City of Ljubljana

LJUBLJANA Winner 2016 EUROPEAN GREEN CAPITAL

European Green Capital 2016 (An initiative of the European Commission)

ZAVOD za GOZDOVE SLOVENIJE
Slovenia Forest Service

Slovenia Forest Service

MUNICIPALITY OF CELJE

The City of Celje

## Supporters

Employment Service of Slovenia

Employment Service of Slovenia

STIHL

STIHL

# Title

19th European forum on urban forestry (EFUF 2016): Urban forests for resilient cities: book of abstracts, May 31 – June 4, 2016, Ljubljana and Celje, Slovenia

**Publisher**

Slovenian Forestry Institute, *Silva Slovenica* publishing centre, Ljubljana 2016

**Editor-in-Chief**

Andrej Verlič

**Editors**

Clive Davies / Robert Hostnik

**Technical Editor**

Anita Mašek

**Cover Design**

Si Design

**Print**

Mediaplan 8 d. o. o.

**Copies**

100

**Price**

15 €

**ISBN**

978-961-6993-05-0

**Electronic Issue**

DOI 10.20315/SilvaSlovenica.0002

ISBN 978-961-6993-06-7

CIP - Kataložni zapis o publikaciji
Narodna in univerzitetna knjižnica, Ljubljana
630*92(082)(0.034.2)
712.25:630(082)(0.034.2)
EUROPEAN Forum on Urban Forestry (19 ; 2016 ; Ljubljana / Celje)
Urban forests for resilient cities [Elektronski vir] : book of abstracts / 19th European Forum on Urban Forestry (EFUF 2016), May 31 - June 4, 2016, Ljubljana and Celje, Slovenia ; [editor-in-chief Andrej Verlič]. - Electronic ed. - El. knjiga. - Ljubljana : Slovenian Forestry Institute, Silva Slovenica Publishing Centre, 2016
Način dostopa (URL): http://dx.doi.org/10.20315/SilvaSlovenica.0002
ISBN 978-961-6993-06-7 (pdf)
1. Gl. stv. nasl. 2. Verlič, Andrej, 1977-
284815616

# EFUF 2016



**#EFUF2016 blog**
efuf2016.worpress.com

**Editor-in-Chief**
Boris Rantaša

**Managing Editor**
Anita Mašek

**Editorial Board**
Anita Mašek / Špela Planinšek / Boris Rantaša / Andrej Verlič / Urša Vilhar / Saša Vochl

**Translations**
Anita Mašek

**Blog ISSN: 2463-946X**

# Contents

# General information

## Conference venues

***Ljubljana:***

- **Ljubljana Castle** – *Grajska planota 1, 1000 Ljubljana* (main venue)

  Conference rooms: Palatium, Concert Hall, Obhodna Hall

- **Slovenian Forestry Institute** – *Večna pot 2, 1000 Ljubljana* (registration and welcome reception)

***Celje:***

- **Narodni dom** – *Trg celjskih knezov 9, 3000 Celje*

  Conference rooms: Large Hall, Upper Hall

## Poster exhibition

The posters will be on exhibition on Wednesday and Friday (June 1-3, 2016) at the main venue, Ljubljana Castle.

## Field trips/workshops

Ljubljana:

- Landscape park Tivoli, Rožnik and Šišenski hrib
- Livada – Green Surge
- Sustainable transport
- Flora of Ljubljana Castle Hill

Celje:

- Urban forest of Celje

## Saturday excursion

Škocjan Caves regional park

## Programme

**Tuesday, May 31, 2016: *Registration and welcome reception***

*Venue:* Ljubljana – Slovenian Forestry Institute

| | |
|---|---|
| **18.00 - 20.00** | **Welcome buffet and registration** |

**Wednesday, June 1, 2016: *Conference Day 1***

*Venue:* Ljubljana – Ljubljana Castle

| | |
|---|---|
| **08.00 - 09.00** | **Check-in and registration** |
| **09.00 - 09.40** | **Opening of the conference** *(Chair: Janez Pirnat)* |
| *Room: Palatium* | |
| 09.00 - 09.10 | Welcome address (*Tomislav Levanič, Slovenian Forestry Institute)* |
| 09.10 - 09.20 | Opening of the conference *(Zoran Janković, Mayor of Ljubljana)* |
| 09.20 - 09.40 | European Green Capital *(Nataša Jazbinšek Seršen, Head of the department for environmental protection of the City of Ljubljana)* |
| **09.40 - 10.30** | **Plenary Session 1** *(Chair: Janez Pirnat)* |
| *Room: Palatium* | |
| 09.40 - 10.10 | ***Keynote 1: Urban forestry – quo vadis?*** *Cecil Konijnendijk van den Bosch* |
| 10.10 - 10.30 | ***Keynote 2: Resilient cities and the urban forest*** *Clive Davies* |
| **10.30 - 11.00** | **Coffee break** |
| *Room: Obhodna Hall* | |
| **11.00 - 12.30** | **Plenary Session 2** *(Chair: Clive Davies)* |
| *Room: Palatium* | |
| 11.00 - 11.20 | ***Keynote 3: The nature of cities: building health from the ground up*** *Tara Zupancic* |
| 11.20 - 11.40 | ***Keynote 4: FAO UPF guidelines: a first step towards greener, healthier and happier cities for all*** *Simone Borelli* |
| 11.40 - 12.00 | ***Keynote 5: Light shades of green: potential governance implications of the European Green Capital Award*** *Natalie Gulsrud* |
| 12.00 - 12.30 | ***Round table discussion*** |
| **12.30 - 14.00** | **Lunch** |
| *Room: Obhodna Hall* | |

| | |
|---|---|
| **14.00 - 15.00**<br>*Rooms: Palatium & Concert Hall* | **Parallel Session 1** |
| **14.00 - 15.00**<br>*Room: Palatium* | **LIFEGENMON** *(Chair: Hojka Kraigher)* |
| 14.00 - 14.15 | ***LIFEGENMON – LIFE for European forest genetic monitoring system***<br>*Hojka Kraigher* |
| 14.15 - 14.30 | ***LUCANUS – a remotely controlled aerial vehicle solution for collecting samples in tree canopies***<br>*Domen Finžgar* |
| 14.30 - 14.45 | ***Importance of forest genetics for (peri)-urban woodlands***<br>*Marjana Westergren* |
| 14.45 - 15.00 | ***Genetic diversity of forest trees in tolerance to environmental stress and urban pollution, and the need for genetic monitoring***<br>*Evangelia Avramidou* |
| **14.00 - 15.00**<br>*Room: Concert Hall* | **GREEN SURGE** *(Chair: Cecil Konijnendijk van den Bosch)* |
| 14.00 - 14.15 | ***A Green Surge in urban Europe – about green infrastructure, green space governance and ecosystem services***<br>*Cecil Konijnendijk van den Bosch* |
| 14.15 - 14.30 | ***The future perspective for community management of green spaces: case studies of long-term community management in Western Europe***<br>*Thomas Mattijssen* |
| 14.30 - 14.45 | ***Urban green infrastructure planning – sharing examples of innovative approaches***<br>*Ana Catarina Luz* |
| 14.45 - 15.00 | ***Urban green area as learning alliance for participatory planning and managing***<br>*Mojca Nastran* |
| **15.00 - 15.30**<br>*Room: Obhodna Hall* | **Coffee break** |
| **15.30 - 17.30**<br>*Different locations in the City of Ljubljana* | **Field trip/workshop** |
| **19.30 -**<br>*Different locations in the City of Ljubljana* | **Guided city tours**<br>Guided city tours in the old city centre |

**Thursday, June 2, 2016:** ***Conference Day 2***

*Venue:* Celje – Narodni dom

| | |
|---|---|
| **08.00 - 09.30** | **Bus trip to Celje with report from the field workshop**<br>Meeting point: parking lot Tivoli at 07.30 |
| **09.30 - 09.40**<br>*Room: Large Hall* | **Welcome address**<br>*Bojan Šrot, Mayor of Celje*<br>*Damjan Oražem, Director of Slovenia Forest Service* |
| **09.40 - 10.30**<br>*Room: Large Hall* | **Plenary Session 3** *(Chair: Cecil Konijnendijk van den Bosch)*<br>***Keynote 6: Tailoring the brand – two decades of development of the Urban forests of Celje***<br>*Robert Hostnik*<br>***Keynote 7: Urban forests and the promotion of a city***<br>*Alan Simson* |
| **10.30 - 11.00**<br>*Room: Large Hall* | **Coffee break** |
| **11.00 - 13.00**<br>*Room: Large & Upper Hall* | **Parallel Session 2 (1-4)** |
| **11.00 - 12.00**<br>*Room: Large Hall* | **PS2-1: Urban forests and resilient cities** *(Chair: Renate Susanna Späth)* |
| 11.00 - 11.15 | ***Evaluation of open green spaces needed to the sustainable urban development in drylands: the case of the metropolitan area of Mendoza, Argentina***<br>*Mariela Arboit* |
| 11.15 - 11.30 | ***Living WITH urban trees: accommodating their needs, enhancing the benefits***<br>*Naomi Zürcher* |
| 11.30 - 11.45 | ***Cemeteries also are of major value to urban tree diversity!***<br>*Johan Östberg* |
| 11.45 - 12.00 | ***Urban-allometry uncovers the scope and limits of nature-based solutions to urban air pollution***<br>*Angus Robert MacKenzie* |
| **11.00 - 12.00**<br>*Room: Upper Hall* | **PS2-2: Urban forests, health and well-being** *(Chair: Astrid Hamm)* |
| 11.00 - 11.15 | ***Elderly's preferences for urban green spaces during heat periods***<br>*Arne Arnberger* |
| 11.15 - 11.30 | ***Ecosystem functions and services for air quality and water supply of urban forest in Seoul, Korea***<br>*Woo-Kyun Lee* |

| | |
|---|---|
| 11.30 - 11.45 | ***Heterogeneity in perception of urban heritage tree's ecosystem services: a case study in Hong Kong***<br>*Wendy Y. Chen* |
| 11.45 - 12.00 | ***Visitor profiles and recreational use in urban forests in the greater Munich area***<br>*Gerd Lupp* |
| **12.00 - 13.00**<br>*Room: Large Hall* | **PS2-3: Urban forests, governance and management** *(Chair: Robert Hostnik)* |
| 12.00 - 12.15 | ***Combining socio-cultural forest monitoring with a National Forest Inventory***<br>*Tessa Hegetschweiler* |
| 12.15 - 12.30 | ***Mountain biking: urban forest threat or opportunity?***<br>*Peter Zajc* |
| 12.30 - 12.45 | ***Essential but under-resourced: are new partnerships required to fund Britain's urban forests?***<br>*Helen Davies* |
| 12.45 - 13.00 | ***The Urban forest of Celje as an open-air classroom***<br>*Boštjan Hren* |
| **12.00 - 13.00**<br>*Room: Upper Hall* | **PS2-4: Urban forests and the promotion of a city** *(Chair: Alan Simson)* |
| 12.00 - 12.20 | ***Key role of youth in urban forestry***<br>*Matej Rupčić* |
| 12.20 - 12.40 | ***Valuing Victoria BID's Urban Forest – a comparison of methodologies***<br>*Nerys Jones* |
| 12.40 - 13.00 | ***Innovative green placemaking with participatory public lighting***<br>*Kasper Rasmussen* |
| **13.00 - 14.00** | **Lunch** |
| **14.00 - 17.00**<br>*Different locations in the City of Celje* | **Field trip/workshop**<br>Urban forest of Celje (guided by Slovenia Forest Service) |
| **17.00 - 18.30** | **Bus trip to Ljubljana with report from the field workshop** |
| **19.30 - 23.00**<br>*Different locations in the City of Ljubljana* | **Social event**<br>Riverboat ride and dinner in Ljubljana |

**Friday, June 3, 2016: *Conference Day 3***

*Venue:* Ljubljana – Ljubljana Castle

| | |
|---|---|
| **09.00 - 11.15** | **Parallel Session 3 (1-4)** |
| *Room: Palatium & Concert Hall* | |
| **09.00 - 10.00** | **PS3-1: Urban forests and resilient cities** *(Chair: Urša Vilhar)* |
| *Room: Palatium* | |
| 09.00 - 09.15 | Did not attend! ***Urban forestry – a wave of green amid concrete jungles*** *Rohit Sharma* |
| 09.15 - 09.30 | Did not attend! ***Analysis of the evolution of holm oaks under preventive phytosanitary treatments in peri-urban areas for sports*** *Concepción González-García* |
| 09.30 - 09.45 | Did not attend! ***Our vision of a resilient urban forest*** *Ross Weddle* |
| 09.45 - 10.00 | ***Can urban trees provide reliable proxies for climate reconstruction?*** *Saša Zavadlav* |
| **09.00 - 10.00** | **PS3-2: Urban forests, health and well-being** *(Chair: Giovanni Sanesi)* |
| *Room: Concert Hall* | |
| 09.00 - 09.15 | Did not attend! ***"It's a walk in the park" Parallel green routes reduce personal exposure to traffic noise*** *John Gallagher* |
| 09.15 - 09.30 | Did not attend! ***Economic value of recreational experience in Swedish forests: evidence from two urban forest areas*** *Eugene Ejike Ezebilo* |
| 09.30 - 09.45 | ***The effect of nature assisted therapy on psychiatric patients: case study of Belgrade, Serbia*** *Maja Vujčić* |
| 09.45 - 10.00 | ***Greener & cooler. Thermal comfort as ecosystem service in the urban forest of Florence, Italy*** *Fabio Salbitano* |
| **10.00 - 11.15** | **PS3-3: Urban forests and resilient cities** *(Chair: Urša Vilhar)* |
| *Room: Palatium* | |
| 10.00 - 10.15 | ***Creating an ecodiverse indigenous urban woodland embedded in compact urban milieu*** *Chi Yung Jim* |
| 10.15 - 10.30 | ***Summary of the London Tree Officers Association Ceratocystis platani UK Protected Zone Status surveys 2014-2015*** *John Charles Parker* |
| 10.30 - 10.45 | ***Wild urban forests and wood biomass landscape laboratories on former brownfield sites as contribution to resilient cities. Good practice Ruhr metropolitan area, Germany*** *Renate Susanna Späth* |

| | |
|---|---|
| 10.45 - 11.00 | ***Social mobilization of citizens on urban forestry: Canadian experiments at the neighbourhood block scale***<br>*Stephen Richard John Sheppard* |
| 11.00 - 11.15 | ***Nature takes over: green change in Ploiesti, Romania***<br>*Pieter Jacobus Wieringa* |
| **10.00 - 11.15**<br>*Room: Concert Hall* | **PS3-4: Urban forests, governance and management**<br>*(Chair: Andreas Bernasconi)* |
| 10.00 - 10.15 | ***Socio-environmental justice: diversity in access to and benefits from green infrastructure and urban forests in Europe***<br>*Rik De Vreese* |
| 10.15 - 10.30 | ***Employing a latent class model to segment public preferences over an urban forest's recreational setting***<br>*Anže Japelj* |
| 10.30 - 10.45 | ***Disaster management in urban forest***<br>*Jurij Kobe* |
| 10.45 - 11.00 | ***Nature capital Urban Forest***<br>*Astrid Hamm* |
| 11.00 - 11.15 | ***Depreciated woody biomass of urban forests as the source of high value compounds***<br>*Primož Oven* |
| **11.15 - 11.45**<br>*Room: Obhodna Hall* | **Coffee break** |
| **11.45 - 13.00**<br>*Room: Palatium* | **Moderated workshop on the emerging topic 1** *(Chair: Clive Davies)* |
| **11.45 - 13.00**<br>*Room: Concert Hall* | **Moderated workshop on the emerging topic 2** *(Chair: Fabio Salbitano)* |
| **13.00 - 14.30**<br>*Room: Obhodna Hall* | **Lunch** |
| **14.30 - 15.30**<br>*Room: Palatium* | **Plenary Session 4** *(Chair: Andrej Verlič)* |
| 14.30 - 14.45 | European Young Urban Forester of the Year 2016 Award |
| 14.45 - 15.00 | Best #EFUF2016 blog Award |
| 15.00 - 15.30 | Closing of the conference *(Clive Davies)* |

## Saturday, June 4, 2016: *Saturday excursion*

| | |
|---|---|
| **08.00 - 17.00** | **Saturday excursion**<br>Škocjan Caves regional park<br>Meeting point: parking lot Tivoli at 07.30 |

## Contributions

### Abstracts in alphabetic order (name of presenting author)

## Keynotes

### Urban forestry – quo vadis?

Cecil Konijnendijk van den Bosch

*University of Hong Kong, SE*

*cecil.konijnendijk@slu.se*

**Keywords**

Urban forestry, EFUF, European Forum on Urban Forestry

The Ljubljana edition of the European Forum on Urban Forestry marks EFUF's 19th anniversary. The Forum will take place in an important context, namely that of Europe's Green Capital for 2016. This offers excellent opportunities to analyze what urban forestry has done – and will do – to develop better, healthier and more vibrant cities, in Europe and elsewhere.

Much has happened within the field of urban forestry since the first Forum took place in the German city of Wuppertal. At the occasion of the Ljubljana Forum and on the brink of the 20th EFUF in 2017, the development of the field of urban forestry during the past decades is discussed. This will be done building on a number of leading 'storylines' as illustrations of contributions, successes and challenges. Urban forestry will be held up critically to modern-day demands and other related approaches and fields. Finally, an attempt will be made to look into the future and describe how urban forestry could look at the occasion of the 40th EFUF, about 20 years from now.

***Cecil Konijnendijk van den Bosch**, a Dutch national, has studied and promoted urban forestry and the role of nature in urban societies for over 20 years. With a special interest in governance issues and socio-cultural aspects of urban forestry, Cecil's past employments have included professorships at the University of Copenhagen and the Swedish University of Agricultural Sciences. He is also (founding) editor-in-chief of the journal Urban Forestry & Urban Greening and the author of close to 300 publications, including the books 'Urban Forests and Trees' and 'The Forest and the City: the cultural landscape of urban woodland'. Together with Francesco Ferrini and Alessio Fini he is currently editing a new Routledge Handbook on Urban Forestry. At the moment Cecil is visiting professor at the Department of Geography, The University of Hong Kong. In July he will take up a full-time professorship in urban forestry at the University of British Columbia in Vancouver, Canada.*

**Notes**

**Resilient cities and the urban forest**

Clive Davies[1,2]

[1]*MD2 Consulting Ltd, United Kingdom*

[2]*Newcastle University, United Kingdom*

*clive.davies@md2.org.uk*

**Keywords**

Resilience, urban green infrastructure, system flows, ecosystem services, policy

Resilience is one of the key words of our times. It has two main meanings in our field of interest. The first, can be broadly described as the capacity of the urban forest to withstand or recover quickly from the pressures upon it. The second is the capacity of the urban forest to support or aid the recovery of the urban region within which it is situated.

The technical challenges of building urban forest resilience are notable but are to some extent well recorded – terms such as adaptive management and managing with uncertainty can be attributed to this lexicon.

The more abstract and discursive element is how urban forests are viewed and seen as part of the 'resilient city'. This leads us into a narrative involving ecosystems services, urban green infrastructure networks and system flows, the role of the planning system, investment and valuing the role of what we already have.

The presentation follows this discursive element to see where it leads in terms of future urban forestry planning and policy.

***Clive Davies*** *is an international consultant on urban forestry and green infrastructure. He is an EU Expert on Green infrastructure, Director of technoprenurial SME, MD2 Consulting Ltd, and a Research Fellow at Newcastle University, UK. He has at various times; advised, worked for or presented to UN FAO, European Commission, numerous local municipalities, CABE and ENGOs. He has also contributed to books, organized conferences, written academic papers and given key note speeches. His experience dates back to the early 1980s when he first encountered urban forestry via urban conservation. 35 years on he now sees his main mission as passing on his experience to the next generation and embedding urban forestry with the green infrastructure discourse.*

**Notes**

**The nature of cities: building health from the ground up**

Tara Zupancic

*Habitus Research, Canada*

*tara.zupancic@habitusresearch.ca*

**Keywords**

Public health, cities, green space, urban health research

Rapid and unprecedented urban growth increases environmental degradation and health risks associated with heat, noise, pollution and crowding, as well as species and habitat loss. Competing needs for roads, houses, and industry can easily usurp urban forests. Given this competition for space, there is a need to understand the critical role of urban nature in supporting human health and how the protection and provision of green spaces and forests can support healthy people, communities and ecosystems. Drawing from her recent systematic reviews on the relationship between urban nature and health, Ms. Zupancic will draw on over two decades of research to explore how green space and urban forests are fundamental to human health and well-being. From increased healthy births and cognitive development in children to the reduction of heat, air pollution and human mortality, Ms. Zupancic will emphasize the imperative for supporting greener cities on a rapidly urbanizing planet.

***Tara Zupancic*** *is a public health scientist and the founder and director of Habitus Research in Canada. She holds a Master in Public Health (MPH) from the University of Toronto's Faculty of Medicine. Working closely with governments, academics and non-governmental organizations, she has helped to lead both national and international agendas on environmental health research and policy. She is the lead author of the David Suzuki Foundation's report on urban green space and health. This report was fundamental to the development of urban health policy and the expansion of forests and green spaces in Canada's largest city.*

*For the past 15 years, Tara has focused on environmental health research and policy that emphasize equity and the priorities of disadvantaged or vulnerable groups. She promotes policy approaches that combine scientific evidence with the knowledge and lived experiences of communities facing serious environmental health challenges.*

**Notes**

**FAO UPF guidelines: a first step towards greener, healthier and happier cities for all**

Simone Borelli[1], Michela Conigliaro[1], Fabio Salbitano[2]

[1]*FAO, Italy*

[2]*Università degli Studi di Firenze*

*simone.borelli@fao.org*

**Keywords**

Guidelines, developing, governance, management, livelihoods

In developing countries, urban growth has often outpaced the capacity of cities to provide dwellers with the ecosystem services (ES) and goods essential for their livelihood. The expansion of cities has often taken place without any real land use planning – with forests and natural landscapes converted for urban uses or depleted to meet increasing demands for space, fuel and building materials – and is increasingly drawing public attention to the need for sustainable urban models.

From research in the US, Europe and other countries with high standards of living, we have learned that trees and forests in and around cities can contribute to increase the quality of life and meet the needs of urban dwellers and to the achievement of the UN SDGs relevant to cities. Urban and Peri-urban Forestry (UPF) and Green Infrastructures (GI) are increasingly becoming a standard component of urban planning in developed countries, but this is not yet the case in many less developed countries. We now need to ensure that these lessons are transferred to countries where income is highly diversified and social equity has glaring discrepancies that influence the enabling environment as the planning, design and management of UPF and GI.

Boosting urban and peri-urban forestry implementation at local, national and global levels requires efforts in raising policy makers and decision takers' awareness on the benefits of UPF, as well as in guiding them towards the development of local technical skills and the implementation of long-term investment decisions. The FAO guidelines on the management on urban and peri-urban, which are now close to completion, are a first step in this direction. Once the guidelines are launched and hopefully will become a reference, it will be essential to ensure that adequate follow-up is provided and that lessons learned through research and practice in Europe and elsewhere are transferred to the fast-growing cities of the developing world.

As an example, at the recent 1st Asia Pacific Urban Forestry Meeting, in particular, participants identified a wide range of other possible tools and activities that could be developed to support developing cities in provide improved ES to their inhabitants.

***Simone Borelli*** *is currently the Agroforestry and Urban/Peri-urban Forestry Officer at the Food and Agriculture Organization of the United Nations (FAO). He holds a first degree in Forest Science from the University of Viterbo, an MSc in Watershed Management from the University of Arizona, and a Postgraduate Diploma in Public Management from the University of London. He started his professional career as a forestry consultant in various countries of Europe. Simone joined the FAO Forestry Department in 1994 and over the years he has worked for FAO in different capacities. He also has worked for the WWF and Bioversity International.*

**Notes**

**Light shades of green: potential governance implications of the European Green Capital Award**

Natalie Gulsrud[1], Silvija Krajter Ostoić[2], Rebecca L. Rutt[3], Bruno Marić[4], Riikka Paloniem[5], David Pearlmutter[6], Alan Simson[7], Maija Faehnle[8]

[1]*University of Copenhagen, Denmark*

[2]*Croatian Forest Research Institute, Croatia*

[3]*University of Copenhagen, Denmark*

[4]*University of Sarajevo, Bosnia and Herzegovina*

[5]*Finish Environmental Institute, Finland*

[6]*Ben-Gurion University of the Negev, Israel*

[7]*Leeds Becket University, England*

[8]*Finish Environmental Institute, Finland*

*nagu@ign.ku.dk*

**Keywords**

Governance, urban forestry and urban greening, urban political ecology, green city branding

The impact of the European Green Capital Award (EGCA) on the governance of urban green infrastructure (UGI) in Europe's most environmentally sustainable and green cities is analyzed. The EGCA represents a new type of governance approach encouraging self-steering or the horizontal network governance of environmental management at the local level. This form of governance is a shift away from top-down decision making and aims to empower local communities to source their own solutions for urban environmental problems in a transnational and multi-level governance system. UGI, which focuses on green spaces and components such as parks and trees, is a delivery mechanism for the social and environmental benefits associated with the sustainable urban growth sought after by the EU. However, green infrastructure is a contested term and the delivery, management and enhancement of biophysically green resources in UGI planning is greatly influenced by political strategy and policy context. The strategies and political interests reflected in the EGCA, used to craft and implement urban sustainability measures including UGI policy, take on a special role of importance. Specifically, the environmental interests favored in the promotion of UGI through the EGCA are investigated using a case-study analysis of the winning EGCA cities between 2010 and 2016. Applying an urban political ecology framework, this paper evaluates the distribution of various elements of UGI in the EGCA winning cities investigating the underlying power dynamics behind this European green city branding campaign. Results show that while the EGCA as a policy tool draws on elements of a green infrastructure approach to urban planning and management, only certain types of UGI are prioritized while others are marginalized. Conclusions show

that network governance policy tools such as the EGCA are limited in their capacity to achieve self-steering and horizontal environmental governance.

***Natalie Gulsrud*** *is an Assistant Professor at the University of Copenhagen, Department of Geosciences and Natural Resource Management, Section for Landscape Architecture and Planning. Her research focuses on exploring the connections between competitive urban governance, urban sustainability and the role of urban green spaces in green infrastructure policy. Natalie has a PhD from the University of Copenhagen in urban green space governance and a Master in Public Administration from the University of Washington Evans School of Public Policy and Governance with a focus on urban sustainability policy*.

**Notes**

**Tailoring the brand – two decades of development of the Urban forests of Celje**

Robert Hostnik

*Slovenia Forest Service, Unit Celje, Slovenia*

*robert.hostnik@zgs.si*

**Keywords**

Urban forest, forest management, recent development, Celje

The City of Celje, the third largest city in Slovenia, already known as a settlement in the Celtic times, has had a long tradition of urban forests. The history of their use and management dates back to the end of the 19$^{th}$ century. A fresh impulse for the development of the potentials of the urban forests of Celje emerged in the 1990s from the local forestry experts. The strategy from 1996, based on adapted forest management and on the infrastructure development, was implemented in the next decade. The number of urban forest visitors tripled and the urban forests of Celje became a kind of a role model for other Slovenian cities. Soon there was a need for upgrading the existing approaches.

The management plan from 2006 further developed the existing concepts and brought in new ideas. It was especially focused on (1) strengthening of governance and users' participation, (2) popularization and branding, (3) coordination of public and private interests (4) education based on forest pedagogy principles and (5) on further development of infrastructure and equipment for recreation, education and experiencing.

The following years brought a stronger recognition and even wider popularity of the urban forests of Celje. Their users have become more active players in the decision-making processes. The partnership between the Slovenia Forest Service and the Municipality of Celje as the two leading actors in the urban forest governance has grown over the years to the level, where the roles and tasks are clearly recognized and accepted. The urban forests have gained a good political support and have become the integral part of the city's master plan. The new recreational and educational equipment, especially the information centre in the form of a treehouse attracts entirely new population of visitors. The brand "Mestni gozd Celje" (City forest of Celje) introduced in 2005, nowadays represents the advanced concept of the urban forest management, which has been cognitively developed in the last two decades.

The future challenges of the urban forest management include innovative marketing activities, further development of educational contents and implementation of instruments for balancing interests in private forests.

***Robert Hostnik*** *graduated in forestry and attained master's degree from the University of Ljubljana. He works as a forest manager at the Slovenia Forest Service. His main fields of interest and expertise are related to the urban forestry, ecosystem services and nature education. For the last 25 years he has been actively involved in the urban forestry development in Slovenia.*

**Notes**

**Urban forests and the promotion of a city**

Alan Simson

*Leeds Beckett University, United Kingdom*

*a.simson@leedsbeckett.ac.uk*

**Keywords**

Magnetic cities, urban forestry, effective communication

The majority of the world's population now lives in towns and cities. Urbanism is not uniform in all countries however. Cities can act like magnets – they can either attract or repel potential multi-cultural/multi-ethnic residents, businesses and investment. Thus cities either continue to grow or shrink – there is no such thing as a static city.

This presentation will consider what makes a city magnetic, and what contributions urban forestry can make to promoting this concept. Such cities have long realized that to succeed and flourish, they need to be able to attract the best, brightest and most creative of the up-an-coming generations. There is no creativity in 'business as usual', and a magnetic city has to look at itself through fresh eyes if it is to succeed in this quest. In addition, if a city isn't good enough to attract new, young residents, why should existing residents put up with it and live there?

Human beings have had a long, deep, cultural relationship with trees, woodlands and the landscape – a relationship which transcends national cultures. Now that most of us are urban-based, has this relationship diminished? The answer to that is an emphatic 'no', but this presentation will go on to consider how this relationship might need careful nurturing in the 21$^{st}$ century magnetic city, and how urban forestry might well be the vehicle to accomplish this.

The public realm is key to developing contemporary magnetic cities, creating and delivering the usable and special spaces that can be used by as many people as possible. Such spaces are the lifeblood of cities, and the contributions that both the micro and the macro urban forest make in articulating these spaces is increasingly being recognized.

Effective communication is critical, and this presentation will conclude with suggesting that the contribution of urban forestry to the promotion of cities is becoming stronger and more significant, as we are increasingly able to engage in 'evidence-based design', defined as an approach to design that emphasizes that we now have the creditable evidence required to support our promotion or urban forestry as the critical key element of successful urban futures.

***Alan Simson*** *is Professor of Landscape Architecture and Urban Forestry at Leeds Beckett University, where he is also Director of Research for Landscape Urbanism. He has been involved with urban forestry/urban greening/urban design for many years, having gained extensive professional experience in the UK New Towns particularly Telford, where he ran the afforestation programme for over a decade. He is very much involved in 'Research into Action', and has been involved with several EU research projects on urban forestry / urban greening, some of which he has led on behalf of the UK, and is on the editorial boards of several international journals.*

*Alan chairs the White Rose Forest, a regional community forest project and is a member of the Leeds Chamber of Commerce's Quality Places and Spaces Group. He chairs the UK Landscape Institute's Urban Forestry Initiative and is a Director/Trustee of both the Community Forest Trust and the Leeds Architecture Centre.*

**Notes**

## Oral presentations

### LIFEGENMON – LIFE for European forest genetic monitoring system

Hojka Kraigher[1], Filippos Aravanopoulos[2], Barbara Fussi[3], Fotis Kiourtsis[4], Monika Konnert[3], Tina Michieli[5], Živan Veselič[6], Marjana Westergren[1]

[1]*Slovenian Forestry Institute, Slovenia*

[2]*Aristotle University of Thessaloniki, Greece*

[3]*ASP Teisendorf, Germany*

[4]*Decentralized Administration of Macedonia & Thrace, Thessaloniki, Greece*

[5]*CNVOS, Ljubljana, Slovenija*

[6]*Slovenia Forest Service, Ljubljana, Slovenija*

*hojka.kraigher@gozdis.si*

**Keywords**

Monitoring, genetic diversity, forest genetic resources

Forest genetic resources face a large number of increasing threats. Climate change, air pollution, unsustainable forest management, invasive species, urbanization and forest fragmentation reduce forest biodiversity, may adversely affect genetic diversity and put at threat the future adaptive potential and sustainability of European forests and their ecosystems. Management and conservation of forest genetic resources is essential and needs to consider all processes which might affect their genetic variability, especially processes influencing the ability of a population to reproduce in heterogeneous environments. Information on relevant changes of a species and/or populations' adaptive and neutral genetic variation through time caused by management and conservation measures is needed. This information can only be obtained through genetic monitoring, which serves as an early warning system to aid the assessment of a species response to environmental change at a long-term temporal scale. With genetic monitoring, temporal changes in population genetic variation can be measured by appropriate parameters and thereby form a special part of biomonitoring, contributing to biological conservation. Within the project LIFEGENMON (LIFE ENV/SI/000148) six project partners are testing the potential of a set of indicators and verifiers of genetic variation for monitoring, based on: forest genetic monitoring (FGM) sites for European beech and Silver fir established in Germany, Slovenia and Greece, developing guidelines for FGM for these two and additional 5 species of different biology, preparing the Manual for FGM and the Decision support system to be applied in all transect countries between Germany and Greece, based on the needs and the means of the policy makers and forestry in the region and wider.

Acknowledgements: The project LIFEGENMON is financed through the European Union's LIFE financial mechanism, and co-financed by the Ministry of the Environment and Spatial Planning and the Ministry for

Agriculture, Forestry and Food of the Republic of Slovenia, the Bavarian Ministry of Food, Agriculture and Forestry, the Green Fund in Greece, and the Slovenian Forestry Institute.

**Notes**

**LUCANUS – a remotely controlled aerial vehicle solution for collecting samples in tree canopies**

Domen Finžgar[1], Marko Bajc[1], Jernej Brezovar[2], Andraž Kladnik[2], Rok Capuder[2], Hojka Kraigher[1]

[1]*Slovenian Forestry Institute, Slovenia*

[2]*Zavod 404, Slovenia*

*domen.finzgar@gozdis.si*

**Keywords**

Drone, canopy sampling, patent pending, robotics, EUFORINNO

In the field of forestry, for both – research and expert work, sampling of tree canopies is a common practice. Usually such sampling is performed either by climbing on to the selected tree, shooting off a branch or by cutting the tree in order to obtain a sample. There are many drawbacks in all of the three methods. Climbing is often too expensive, dangerous and time-consuming, shooting off the branches offers only random sampling and is unsuitable for urban environments because of the potential dangers present. Cutting trees for the sole purpose of obtaining a sample is generally unacceptable and offers no sampling replications.

With the recent progress and popularization of remotely controlled multirotor drones in both professional and hobbyist communities, the Department of Forest Physiology and Genetics at the Slovenian Forestry Institute started exploring the idea of developing a remotely controlled drone-based system for collecting samples in tree canopies that would overcome the aforementioned drawbacks. Within "Research and Innovation" - focused EUFORINNO project and in collaboration with the Institute 404 a working prototype has been developed, named LUCANUS – Lightweight Upper CANopy Uav Sampling – (http://lucanus.gozdis.si/) and was publicly presented during EUFORINNO workshop on genetic monitoring held on 25$^{th}$ January 2016.

LUCANUS is a remotely operated mechanical arm with a sample cutting and grabbing tool, which can be attached to any drone with appropriate characteristics (currently tested on an eight-rotor Sky Hero Spyder X8 airframe with DJI autopilot). While LUCANUS is not the first device for remote aerial sampling in forestry (UC Berkeley "Drone sampler", https://nature.berkeley.edu/garbelottowp/?p=1801) it is the first device that offers the following advantages:

a) Precision sampling by using laser marker and camera system; b) high payload capacity (7 kg); c) a safety release mechanism that detaches the robotic arm from the drone in case of emergency, d) sampling in dense forest tree stands and at distances at which drone cannot be guided with a bare eye.

Such system is considered a novelty and has been submitted for a grant of patent at both Slovenian (application P-201500288) and European (application EP16150006.1) patent offices.

**Notes**

**Importance of forest genetics for (peri)-urban woodlands**

Marjana Westergren, Hojka Kraigher

*Slovenian Forestry Institute, Slovenia*

*marjana.westergren@gozdis.si*

**Keywords**

Genetic variation, genetic monitoring, urban forest

Self-sustainability of (peri)-urban tree populations depends on their (adaptive) genetic variation ensuring successful regeneration, good survival and growth and resistance to myriad of changing biotic and abiotic stresses. Where natural regeneration of (peri)-urban woodlands, promoting recruitment of well adapted, genetically diverse seedlings is not possible, either as a result of degraded soil, absence of high enough number of unrelated fruiting trees or envisaged change in species composition, planting material should be genetically matched to the new environment. Special care must be taken to genetic considerations, i.e. genetic variation within and among populations of the species to be planted and to appropriate seed collection and handling practices to counteract genetic erosion leading to poorer reproductive success, lower persistence in stressful environment, poorer growth and higher susceptibility to pests and diseases. Genetic monitoring (i.e. quantification of temporal changes in population genetic variation and structure leading to the assessment of the dynamics of transition from the present to the future genetic status of a stand) might be especially important in (peri)-urban woodlands as an early warning system of changes about to happen at the ecosystem level.

Acknowledgements: The work was prepared within LIFEGENMON project financed through the European Union's LIFE financial mechanism, and co-financed by the Ministry of the Environment and Spatial Planning and the Ministry for Agriculture, Forestry and Food of the Republic of Slovenia, the Bavarian Ministry of Food, Agriculture and Forestry, the Green Fund in Greece, and the Slovenian Forestry Institute.

**Notes**

**Genetic diversity of forest trees in tolerance to environmental stress and urban pollution, and the need for genetic monitoring**

Filippos A. Aravanopoulos, Lemonia Papagrigoraki, Evangelia V. Avramidou, Irene Zacharopoulou

*Laboratory of Forest Genetics and Tree Breeding, Aristotle University of Thessaloniki, Faculty of Agriculture, Forestry and Natural Environment, Thessaloniki, Greece*

*aevaggelia@yahoo.com*

**Keywords**

Pollution tolerance, DNA fingerprinting, phenotypic selection, genetic monitoring, urban environment

In a progressively stressed urban environment, the presence of vegetation that exhibits tolerance to environmental stress is a factor of paramount importance for living conditions especially in large urban centres. In this study, trees that show different phenotypic response to urban environment stresses and are present in polluted areas of the Thessaloniki metropolitan area were assessed. Trees that present diversifying phenotypic response in environmental stress (phenotypically "tolerant and sensitive" individuals) were selected in spatially close pairs of divergent phenotypes from tree-rows, parks and peri-urban forests. A comparative analysis at the pair level was conducted with regards to phenotypic assessment, growth parameters, leaf morphometrics and genetic profiling of selected trees by using molecular (SSR, RAPD) and isoenzyme genetic markers. Over a course of 20 year's assessments, 47 phenotypically tolerant trees have been identified, belonging to 17 species. In total, 71% of selected tolerant trees are found in heavily polluted areas where, besides environmental stress, selection intensity may by higher. The temporal assessment (for a 20-year period) has identified extremely stable results of pair-trees stability in phenotypic expression in 18% of the comparisons made leading to the identification of 19 phenotypically tolerant plus-trees that belong to eight species. Selected individuals originating from the *Populus*, *Celtis*, *Platanus* and *Robinia* genera were evaluated. Tree height, diameter and age were recorded, and each pair was graded in a scale of 1 to 10 based on phenotype (10 indicating fully tolerant healthy phenotypes). Leaf morphometrics were investigated, using 10 leaves per side from the four different aspects of each tree. Results showed that within pairs the observed differences were significant between 'tolerant' and 'sensitive' phenotypes, while 'tolerant' trees exhibited higher growth and larger leaves. The identity of all trees was unequivocally identified by DNA fingerprinting. Overall it was indicated that the degree of tolerance to environmental stress and urban pollution is related, to species and genotype, but this needs further investigation and verification analysis under controlled environmental conditions. The long-term field evaluation of selected plus-trees tolerant to environmental pollution can be achieved by genetic monitoring, the quantification of temporal changes in population genetics and dynamics metrics.

**Notes**

**A Green Surge in urban Europe – about green infrastructure, green space governance and ecosystem services**

Cecil Konijnendijk van den Bosch[1,2]

[1]*University of Copenhagen, Denmark*

[2]*Hong Kong University, Hong Kong*

*cecil.konijnendijk@slu.se*

**Keywords**

Green infrastructure, green space governance, biocultural diversity, planning, ecosystem services

The EU-funded research projects GREEN SURGE (www.greensurge.eu) brings together 23 partners from 11 countries to study urban green spaces and their planning and governance. Specific focus is on the close linkages between biodiversity and cultural diversity, as reflected in the focus on a biocultural diversity perspective within the project. The project also looks at selected ecosystem services provided by urban green infrastructure across Europe, and ways of valuing and marketing these.

With the project well into its third year, a series of interesting findings have been produced. These include, for example, a series of 20 European 'city portraits' on urban green space planning and governance. Governance arrangements for urban green space have been studied as well, as have different ways of planning green infrastructure. The economic dimensions of green space services are another area in which GREEN SURGE has made interesting and novel contributions.

In the project's current stage, focus is on five Urban Learning Labs (one of which is Ljubljana) in which state-of-art research meets practical needs.

This presentation introduces the GREEN SURGE project and its findings to date. It provides an integrative frame for studying urban green space in an era of increasing focus on green infrastructure and nature-based solutions for vibrant and resilient cities. The presentation sets the wider scene for a parallel session with presentation of selected findings from the project. It will offer insights into how researchers, practitioners, businesses and local communities can collaborate for enhancing a true 'green surge' in our cities and towns.

**Notes**

**The future perspective for community management of green spaces: case studies of long-term community management in Western Europe**

Thomas Mattijssen[1], Sander Van der Jagt[2], Arjen Buijs[1], Birgit Elands[1], Sabrina Erlwein[3], Raffaele Lafortezza[4]

[1]*Wageningen University and Research Centre, The Netherlands*

[2]*Forest Research, United Kingdom*

[3]*Technischer Universität München, Germany*

[4]*University of Bari, Italy*

*thomas.mattijssen@wur.nl*

**Keywords**

Place keeping, community management, urban green, innovative governance

This paper discusses the potential of communities of citizens to contribute to the long-term management or place keeping of public urban green spaces. While (local) governments have been managing such spaces for long periods of time, it is still debated if citizens can realize a similar continuity in their management of green space in order to sustainably conserve its qualities. To provide input in this debate, this paper looks at four 'good practices' of place keeping by communities in Amsterdam, Berlin, Milan and Edinburgh.

These case studies highlight that place keeping by local communities is not self-evident and that it requires a constant effort from the involved citizens. Although the communities in our case studies have successfully managed green spaces for years or even decades, there have been many challenges along the way. Such challenges included difficulties in connecting with local citizens and authorities; securing resources for place keeping; and dealing with changes in policy or even possible urban development in the involved spaces.

On the other hand, a set of established rules and procedures have shown to provide stability, and a large and stable network can also support communities involved in place keeping. Local authorities have had a strong enabling and supporting role in our case studies, but discontinuity in their support and changes in policy have also been a major threat to place keeping in some cases. The most important overall conclusion from our case studies is that place keeping requires an adaptive attitude from citizens involved in order to cope with spatial and social developments and changes in policy.

**Notes**

**Biocultural diversity – A framework on the urban setting**

Ana Catarina Luz[1], Cristina Branquinho[1], Margarida Santos-Reis[1],

[1]*cE3c - Centre for Ecology, Evolution and Environmental Changes, Faculdade de Ciências da Universidade de Lisboa*

*Research under taken at: cE3c - Centre for Ecology, Evolution and Environmental Changes, Faculdade de Ciências da Universidade de Lisboa*

*acluz@fc.ul.pt*

**Keywords**

Almada, biodiversity, climate change adaptation, Lisbon, planning strategy

During the last decades the relationship between biodiversity and human diversity has received increased attention, resulting in the identification of an 'inextricable link' between biological and cultural diversity, or also called, biocultural diversity. This term has been proposed for denoting this link at the global scale and for exploring the implications of it for both nature and culture. Global cross-mappings of the distributions of biodiversity (using number of birds, mammals, and/or vascular plants as indicators) and linguistic diversity (taken as a proxy for cultural diversity) revealed significant geographic overlaps between the two diversities, especially in the tropical countries.

These approach, however, failed to take into account the various ways in which different groups of people make use of biodiversity, as for instance on the urban setting. Researchers have been recognizing that cities enclose networks of green spaces, which can play an important role to ensure the well-being of city-dwellers, urban biodiversity and ecosystem services. With rapid urbanization and population growth, these urban green spaces are increasingly becoming important places to address sustainability and climate change resilience in cities. Considering the biocultural diversity framework in an urban context may help to address these subjects and provide policy makers a tool to link spatially and functionally the green network by promoting cities cultural and biodiversity.

We present the biocultural diversity framework as a dynamic socio-ecological system composed by the biophysical, cultural, and governance/stewardship dimensions. The biophysical dimension is composed by the green infrastructure, which support biodiversity and human well-being. The cultural dimension can be described as the system of values, beliefs, ideas and behaviors of social groups. Governance/stewardship can be defined as the involvement of a range of actors in the process of governing, and is the dimension that sustains the other two. These dimensions connect each other through the use and value people attribute to green spaces, as well as their access to those spaces. In cities the biocultural diversity concept can be applied at both the city level and the urban green space level, through the use of several indicators that allow the links between the several dimensions.

**Notes**

**Urban green area as learning alliance for participatory planning and managing**

Mojca Nastran[1], Rozalija Cvejić[2], Špela Železnikar[2], Marina Pintar[2]

[1]*University of Ljubljana, Biotechnical Faculty, Department of Forestry*

[2]*University of Ljubljana, Biotechnical Faculty, Department of Agronomy*

*mojca.nastran@bf.uni-lj.si*

**Keywords**

Urban green area, youth, participatory planning, multifunctional, learning alliance

Every European city has its own challenges when it comes to planning and governing urban green areas. One of the areas in which Ljubljana could improve its green planning is the field of public participation. There is evidence from GREEN SURGE (7FP project) showing that green areas fit more to citizens' needs if they are engaged in the process of planning the green areas. Increasing and fine-tuning the range of ecosystems services (ESS) of green spaces to the citizens' needs contributes to higher quality of urban green spaces.

Despite the City of Ljubljana having large amounts of urban green spaces with various ESS and being very active in planning urban green infrastructure, the local government does not yet actively include citizens. To demonstrate that participation in planning and governance of urban green areas increases the quality and multifunctionality of urban green spaces, the Ljubljana Learning Alliance (LA) focuses on engaging young people, a vulnerable group in society, in creating urban green spaces. The goal of the Focal LA is to establish a new youth multifunctional green area on a selected site owned by the City of Ljubljana – namely LIVADA – by the year 2017.

The main goal of LA is to explore various models of participatory planning and governance of public urban green areas for better integration of biodiversity, society and green economy with UGI in order to find solutions to the challenges in the development of a healthier urban living environment. The concrete objectives of the LA are:

- To consider the implementation of GREEN SURGE guidelines to advance approaches in ESS development, planning and governance of urban green spaces.

- To consider the possibilities of transferring the principles of the advanced approaches in ESS development, planning and governance to the local planning environment.

- To apply the project-based learning approach to planning and governance of urban green spaces through a three-year work project with youth at LIVADA

- To monitor and evaluate the project-based learning approach applied in the LA as a tool to be used in the planning and governance of urban green spaces.

**Notes**

**Evaluation of open green spaces needed to the sustainable urban development in drylands: the case of the metropolitan area of Mendoza, Argentina**

Mariela Arboit

*CONICET, Argentine Republic*

*marboit@mendoza-conicet.gob.ar*

**Keywords**

Green spaces, urban building morphological variables, land use, sustainable urban development

Population increase, accompanied by various socio-economic problems, has resulted in a marked trend towards urbanization, and, in the most problematic cases, without land management policies and guidelines of environmental sustainability. Intensive urbanization is associated with the occupancy and modification of the soil. One of the variables considered to determine the impact of land use is dryland vegetation cover. The study of morphological variables of urban buildings and urban tree canopy cover is essential for sustainable urban development in arid areas. The objective of this study is to assess the environmental impact caused by covering land area with building development in Greater Mendoza. In this application, a representative sample of 32 urban blocks is considered, selected according to the shape, orientation and municipal morphology. Preliminary results show that public and private green spaces occupy only 21% of the total area of the blocks considered, while the remaining 79% are occupied by constructed area, areas of sidewalks and streets, and areas of closed and open irrigation ditches. Open green areas are insufficient to offset the impact of land use in drylands. It is recommended to evaluate compensation strategies, such as increasing green spaces with species of low-water requirements, or vine canopies, among others.

**Notes**

**Living WITH urban trees: accommodating their needs, enhancing the benefits**

Naomi Zürcher

*Arbor Aegis, Switzerland*

*treerap@sprintmail.com*

**Keywords**

Urban forest, arboriculture, planning, design, management

In our ever-evolving relationship with nature, urban living has initiated what was once thought of as an oxymoron – the Urban Forest – a complex ecosystem consisting of trees, associated green spaces and all their living inhabitants, including us.

Tree species, originating in forests round the world, are cohabiting with us in our cities and urban areas and we have come to recognize the many contributions our urban trees are making in the form of Ecosystem Service deliverables. “Urban forests can improve environmental quality, enhance individual and community well-being, provide a wide range of services to individuals and communities, and produce a more healthful and comfortable environment...” (Dwyer, Nowak, et al)

As a result of extensive research, we know that the mature urban tree is a critical element in the cost-effective mitigation of many of urban development's environmental, health and social well-being impacts. And yet, as critical as the urban tree is and as essential as the deliverables are, the human approach to development has not focused adequate attention on the needs of this living green Resource.

While a vast array of research papers has attested to a long list of environmental benefits provided by trunk and canopy, scant mention has been made of the WHAT that is essential for an urban tree to HAVE a healthy trunk and canopy – that landscape underground. Affording urban trees the growing conditions that would enable them to deliver on our expectations requires a more informed approach to the planning, design and management of our green spaces. The bottom line for trees is you can’t have top without bottom.

This Practitioner presentation will discuss our present approach to Urban Planning, Landscape Design and Urban Forest Management. How uninformed decisions are impacting our Urban Forest, its ability to be robust – healthy and vigorous – and thus its ability to cost-effectively mitigate environmental and health issues inherent to urbanization. The Urban Forest, as a Public Resource, belongs to everyone and if it is to be a well-managed, healthy Resource, it will take an informed and invested constituency to make this possible.

**Notes**

**Cemeteries also are of major value to urban tree diversity!**

Johan Östberg

*Swedish University of Agricultural Sciences, Sweden*

*johan.ostberg@slu.se*

**Keywords**

Species diversity, management, cultural value, biological value, social value

Urban tree diversity is mainly focused on tree populations managed by cities, municipalities and other government agencies. But, in many European, and especially Nordic countries, cemeteries are an important part of urban forestry. Many cemeteries play an important role as de-facto urban parks where they e.g. offer settings for running and for finding tranquility and shade. The role of cemeteries as urban parks is also increasing as Nordic cities are densifying and the number of green spaces is decreasing.

Cemeteries are not only important for their social benefits, they are also an important contributor to species diversity. An inventory of three cemeteries in Malmö revealed over 170 different species and cultivars of woody plants. Especially old trees on cemeteries have high biological values, e.g. by hosting insects, fungi, birds and lichens. Many Nordic cemeteries also have important cultural values as they often were designed by famous landscape architects and through there long history can illustrate changing views in landscape architecture. Their cultural and aesthetic values also relate to old alleys and pollarded and grafted trees.

Cemeteries are thereby important for their range of cultural, biological and other social values. These values can however come in conflict due to different interests, legislation and management aims. To be able to preserve and develop these values the Swedish actors (including the Association of Municipal Gardeners; Environmental Protection Agency; National Heritage Board; Provincial government; Transport Department; Swedish Church's National Organizations and Swedish University of Agricultural Sciences) have created a unique model for managing trees in the urban environment and cemeteries in particular.

The presentation will focus on the values that cemeteries provide and the problems with making these values to coexist, especially when actions need to be taken due to tree diseases, risks, and lack of vitality or poor species distribution.

**Notes**

**Urban-allometry uncovers the scope and limits of nature-based solutions to urban air pollution**

Angus Robert MacKenzie[1], Matt Barnes[2]

[1]*Birmingham Institute of Forest Research, University of Birmingham, Birmingham B15 2TT, UK*

[2]*Lancaster Environment Centre, Lancaster University, Lancaster LA1 4YQ, UK*

*a.r.mackenzie@bham.ac.uk*

**Keywords**

Air quality, allometry, policy-making

Allometry uncovers structures and patterns by relating the characteristics of complex systems to a measure of scale, and is commonly used in forestry and arboriculture to estimate timber stocks. Allometric studies are now also firmly established as a tool for understanding the intrinsic socio-economic behaviour of cities, but cities are, in fact, socio-economic and environmental systems. Applying allometry to the environmental aspects of urban areas allows us to examine how environmental quality varies with the size of an urban area, and also to determine to what extent green infrastructure or nature-based solutions can influence urban environmental quality.

We present an allometric analysis of air quality for UK urban settlements. We show that the scaling of traffic-related emissions is not simply a reflection of road length, but rather results from the socio-economic patterning of road-use. We develop a theory to predict the population-scaling of urban air quality concentrations, which is consistent with the single study of urban air pollution concentration allometry. We demonstrate why, although air quality is worse in large urban centres compared to small urban centres, the overall effect is an economy of scale (i.e., large cities reduce the overall burden of pollution). The model also explains which properties of nature-based solutions or green infrastructure can make a significant contribution at city scale, and elucidates an opportunity — through urban forestry — to make large cities absolutely cleaner than smaller cities in terms of their airshed-average pollutant concentration. We describe this last point as an 'urbanization dividend', clearly of importance in this rapidly urbanizing world.

A further analysis looking at the allometric scaling of pollution 'hot spots' predicts the likelihood of their occurrence to increase with the size of an urban area, emphasizing the potential for judicious use of green infrastructure on the local (i.e., neighbourhood) scale.

**Notes**

**Elderly's preferences for urban green spaces during heat periods**

Arne Arnberger[1], Brigitte Allex[1], Renate Eder[1], Martin Ebenberger[1], Anna Wanka[2], Franz Kolland[2], Peter Wallner[3], Hans-Peter Hutter[3]

[1]*University of Natural Resources and Life Sciences Vienna, Austria*

[2]*Department of Sociology, University of Vienna*

[3]*Institute of Environmental Health, Center for Public Health, Medical University Vienna*

*arne.arnberger@boku.ac.at*

**Keywords**

Climate change, discrete choice experiment, green infrastructure, heat stress, urban heat island, vulnerability

Heat affects cities because of the urban heat island effect and will increasingly affect these areas due to ongoing urbanization and climate change. Among those most vulnerable towards urban heat are the elderly. This study, which was supported by the ACRP Program of the Austrian Climate and Energy Fund, analyzed green space preferences of 200 elderly residents living independently in urban heat islands of Vienna on hot days. A visual discrete choice experiment employed digitally calibrated images to simulate 128 urban green spaces and green space access scenarios. This study found that the elderly prefer green spaces which provide shadow and a pond and which are easily accessible and cooler than the home, and where they can meet friends. Trees are preferred over blue space. An access street with trees would encourage them for a visit. Study findings underline the importance of a heat-adjusted green-space design for the elderly.

**Notes**

**Ecosystem functions and services for air quality and water supply of urban forest in Seoul, Korea**

Woo-Kyun Lee, Cholho Song, Heunwoo Cho

*Korea University, Korea, Republic of (South Korea)*

*leewk@korea.ac.kr*

**Keywords**

Forest, ecosystem functions, ecosystem services, social service, human needs

Application of ecosystem service concept in environmental related decision making could be numerical and objective standard for policy maker between preserving and developing perspectives of environment. Despite increasing interest in ecosystem services, the difference between ecosystem functions and ecosystem services were still not clearly understood by policy makers and stakeholders. This study proposes the methods of evaluating ecosystem functions and services based on environmental and socio-economic factors. The differences between ecosystem functions and services were presented in terms of air purification and water yield of a forest ecosystem. This study suggested Natural Functions (NF), Environmental Services (ES) and Environmental Social Services (ESS) to specify ecosystem functions and services. NF were direct and potential functions from a specific ecosystem that could be connected with other specific ecosystem functions. ES were the ecosystem services that employed only environmental conditions. ESS were the ecosystem services that related to social conditions as well as environmental conditions. In the case of air purification, air pollutants absorption capacity was employed for quantifying NF. And water yield capacity was applied for the NF quantification of water supply. Air pollutant and precipitation were set as the environmental condition for ES to indicate the natural or human influence which made actual quantification among NF capacity. Population was set as the environmental social condition to indicate the human needs which made service demands in both air purification and water yield. The study found that the value of NF was spatially, randomly distributed according to the forest condition, while the values of ES and ESS were high in urban forest where high population density brings high pollutant density and high demand for water supply. With an understanding of the differences among the NF, ES, and ESS concepts, decision makers could be equipped with more efficient and effective tools for the management of ecosystem services in urban forest.

**Notes**

**Heterogeneity in perception of urban heritage tree's ecosystem services: a case study in Hong Kong**

Wendy Y. Chen

*University of Hong Kong, Hong Kong S.A.R. (China)*

*wychen@hku.hk*

**Keywords**

Urban heritage tree, public perception, cultural value, environmental value, Hong Kong

Urban heritage trees, a small cohort of arboreal asset, have been central to the management and conservation, as they can provide distinctive ecosystem services to urban society. Especially in compact cities like Hong Kong, urban heritage trees face tremendous pressures, partly due to the insufficient recognition and perception of their benefits. There is little knowledge on urban dwellers' perceptions and attitudes towards urban heritage trees and a lack of meaningful insights regarding the contributions of these natural-cum-cultural entities to human well-being. This study investigates Hong Kong residents' perception of urban heritage trees' ecosystem services. Factor analysis reveals heterogeneous perceptions amongst residents. The historical and cultural benefits pertaining to urban heritage trees are clearly recognized and highly valued, in comparison with the biological and environmental benefits. Age, gender, educational level would affect residents' perception significantly. These findings could help designing management programs so that public recognition of urban nature could be fostered and the social welfare associated with urban heritage trees increased.

**Notes**

**Visitor profiles and recreational use in urban forests in the greater Munich area**

Gerd Lupp[1], Valerie Kantelberg[2], Bernhard Förster[1], Stephan Pauleit[1]

[1]*TU München, Germany*

[2]*Bavarian State Institute of Forestry*

*gerd.lupp@tum.de*

**Keywords**

Recreation activities, visitor counting and monitoring using trigger trail cameras, interviews

Urban proximate forests are heavily frequented for recreation and a number of offers such as trails and infrastructure is provided. Managers want to evaluate their efforts promoting urban proximate forests, offers and adapt capacities according to the recreational. A core question is the amount of visitors, activities, spatial and temporal distribution of different visitor groups. However, methods used should be cost-efficient, flexible and should deliver information about user groups such as mountain bikers or dog walkers.

For this purpose, we opted to use trigger trail cameras to count and assess the recreational use and importance of forest structures. To meet high privacy standards in Germany, the camera lenses had to be partially blinded. Two study areas next to the campus (Forest Adventure Trail Freising and Arboretum Kranzberg) were selected to serve as our study area testing the camera method and for conducting interviews. Different routines to analyze and evaluate the pictures are used and ongoing at the time writing this abstract.

First results indicate more than 40.000 passers per year at the Forest Adventure Trail and around 21.000 at the Arboretum. In the winter months, the maximum recreational use in the forests was at dusk around 17:00. Dog walkers and joggers have a tow peak distribution in the morning and evening. Correlating the recreational use with temperatures, it can be shown that recreational use in the forests increase up to a maximum temperature of 30° C, above this temperature, patterns change. There is a drop between noon and 15:00, a shift to less distant parts of the forest with infrastructure (beer garden) nearby and significant recreational activities in the late evening.

**Notes**

**Combining socio-cultural forest monitoring with a National Forest Inventory**

Tessa Hegetschweiler, Christiane Plum, Urs-Beat Brändli, Christoph Fischer, Christian Ginzler, Marcel Hunziker

*Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland*

*tessa.hegetschweiler@wsl.ch*

**Keywords**

Social and natural scientific forest monitoring, linkage of physical and social data, method development, forest recreation

Forest policy planning and management is often based on forest inventory data. However, the importance of social aspects such as aesthetic and recreational values is increasing, especially in urban areas, and needs to be considered in forestry practice. Forest inventory data is normally collected from sample plots on a systematic grid across the country. The social dimension of forest is usually monitored with on-site or off-site questionnaire surveys. Both monitoring approaches are seen as necessary and implemented in many countries, but are rarely if ever combined. Therefore, our research question was: Can socio-cultural forest monitoring be combined with a National Forest Inventory (NFI) with the aim of creating a more comprehensive forest monitoring instrument?

We conducted a forest visitor survey at selected National Forest Inventory sample plots in urban forests in order to test whether this would be a way of integrating the social dimension of forest with national forest inventories towards a more comprehensive forest monitoring instrument, focusing on forest recreation and aesthetics. Visitors were asked to rate the visual attractiveness of the NFI plot and the surrounding forest. They were also asked about forest preferences, recreational activities in the forest and their socio-demographic background. Multi-level modeling combining both plot-related inventory data and visitor-related questionnaire data showed that perceived forest attractiveness is determined by both social and physical factors.

We conclude that it is worth further developing this method with the aim of implementing forest visitor surveys at a subset of NFI plots during routine field assessments, and, thus, significantly improving monitoring of forest recreation.

**Notes**

**Mountain biking: urban forest threat or opportunity?**

Peter Zajc[1], Nejc Berzelak[2]

[1]*RRA Koroška, Regional Development Agency for Koroška, Slovenia*

[2]*University of Ljubljana, Faculty of Social Sciences, Slovenia*

*peter.zajc@rra-koroska.si*

**Keywords**

Mountain biking, outdoor sports, urban forests, community, trail development

Mountain biking is a popular outdoor sport and modern mountain biking embraces a variety of riding styles. Mountain bikers often desire to ride on narrow trails in natural areas. The increased interest in mountain biking on trails in natural areas requires its systematic management. Riding in different parts of natural areas is a common practice in Slovenia and such activities are largely tolerated, despite current legal restrictions. With large areas of Slovenia covered by forest these areas often provide grounds for mountain biking. Particularly attractive are forests close to the urban areas. With the lack of systematic management informal trails for mountain biking are often created.

Although life style sports like mountain biking strongly emphasize individualism, they also foster emergence of subcultures around them. The survey among Slovenian mountain bikers results have shown that mountain bikers are not willing to pay fees for riding on trails in natural areas. However, they express a high willingness to voluntarily participate in trail maintenance activities. Clubs and associations have an important potential in this aspect, because survey results have shown 50% of all respondents included in the survey were members of some organization related to mountain biking. This can also establish a foundation for soft actions and measures to construct a solid grassroot mountain biking community aimed at developing and maintaining formal trails, responsible access and trail tolerance. With systematic management mountain biking could foster participations of youngsters in more active and healthier life style.

**Notes**

**Essential but under-resourced: are new partnerships required to fund Britain's urban forests?**

Helen Davies[1], Kieron Doick[2], Malcolm Hudson[1], Liz O'Brien[2], Kate Schreckenberg[1], Gregory Valatin[2]

[1]*University of Southampton, United Kingdom*

[2]*Forest Research, United Kingdom*

*hjd1g15@soton.ac.uk*

**Keywords**

Funding, governance, management, local authorities, Britain

Urban forests provide a multitude of benefits to society of which aesthetic and recreational opportunities are the most widely recognized. However, concern about the impacts of climate change on urban environments has also led to a growing interest in a range of regulatory ecosystem services such as temperature regulation, air purification and flood control. The extent to which these different benefits are realized is, in part, dependent on urban forest management and governance; in particular, the management objectives, the availability of funding, and stakeholder involvement. This study aims to establish the extent to which British local authorities consider ecosystem services in urban forest governance and management, how much citizens and businesses are involved in this process, and whether current funding approaches are sufficient to maintain and enhance provision of ecosystem services from Britain's urban forests. Interviews were carried out with staff responsible for tree management decisions in a dozen local authorities from across Britain, selected to be representative in terms of population, geography and size, and with varying urban tree cover. We find that local authorities have multiple objectives for urban forest management, ranging from health and safety and legal compliance, to biodiversity conservation and visual amenity, but with relatively little focus on ensuring provision of regulatory ecosystem services either now or into the future. While there is growing interest in involving a wider range of stakeholders in decision-making about urban forests, in practice this is mostly restricted to working with community groups associated with specific green areas. In terms of funding, we outline the ways in which local authorities determine their urban forest budgets and find that these often only stretch to covering legally mandated requirements, with little room to cater for the wider range of ecosystem services. This work provides a clear understanding of the governance, management and funding of Britain's urban forests, and how this could be improved, for example through widening participation and taking an ecosystem services approach. We propose further research to develop more innovative governance and funding approaches to sustain and optimize the multiple benefits obtained from urban forests.

**Notes**

**The Urban forest of Celje as an open-air classroom**

Boštjan Hren

*Slovenia Forest Service, Unit Celje*

*bostjan.hren@zgs.si*

**Keywords**

Urban forest, forest pedagogy, children, education, Celje

**Summary**

The City of Celje has, for more than a decade, been systematically developing the forests in its direct vicinity. This forest development is especially important in terms of the city's ecological and social functions. Celje's nearest forests lie on the southern edge above the City Park. Through its well-planned development of infrastructure, the purchasing of private forests and adapted management, the Urban Forest of Celje has now become the city's largest public greenspace; it is intended for citizens' recreation, leisure and experience. Due to its proximity to the city, the Urban Forest of Celje offers an excellent opportunity for educating, training and informing citizens about the significance, functioning and conservation of natural ecosystems.

In the Municipality of Celje there are 10 primary schools, 17 kindergartens and 8 high schools (some 11000 children in total); each of these schools is very close to the Urban Forest of Celje or in the immediate vicinity of the surrounding forests. The Slovenia Forest Service has been methodically dealing with the pedagogical task of educating children and youth since 2003.

The activities based on the principles of forest pedagogy are used to provide knowledge about the importance of forests, forest ecosystem and forestry as an economic entity. In 2015 the Slovenia Forest Service Local Unit of Celje and Municipality of Celje, along with other project partners from Croatia, carried out the EU project "GREEN4GREY" – Forest for Cities. The project has enabled the Urban Forest of Celje with its tree house and children's forest playground to become the centre of the "Nature (urban) forest experience". Through "Forest Lab" and "Forest Mandala", the Urban Forest Celje has become an open-air classroom – an added value for children and youth learning about forests.

In the last 7 years more than 1000 children per year have visited the forest and participated in forest pedagogy. Educational and experiential activities based on the principles of forest pedagogy in the Urban Forest of Celje influence children's lives outside school and also within their family life, since they can explore the forests together with their parents.

**Notes**

**Key role of youth in urban forestry**

Matej Rupčić

*Urban forestry student association, Croatia*

*matej_vkci@hotmail.com*

**Keywords**

Youth, UFSA, popularization, development

Urban forestry is a young and unknown field of science in Croatia and as such requires a lot of popularization and development. This is a primary goal of Urban forestry student association, a group of students attending University of Forestry in Zagreb, and the study program: Urban forestry, protection of the nature and the environment.

From the experience of self-branding the association students learn a lot about governance, management and promotion. The pillars of our work are set on volunteering and raising social awareness, and those two combined with general openness of the younger generation makes us more approachable to the public. This sparks community enrollment, because setting a good example is the best way to affect others.

UFSA is an educational community, and uses social media to make an impact upon individuals and associations. Young people play a key role in shaping the environment around them as there is no movement or trend that they don't start or follow. With such understanding of trends it is easy to see how it is the students who can make it about the right cause, the green cause. And they prevail in social impact far more then doctors and professors, because who knows more about branding and social media then them?

In conclusion the youth won't develop urban forestry in technical terms, but are the best driving force behind giving it a social impact that will make it greater.

**Notes**

**Valuing Victoria BID's Urban Forest – a comparison of methodologies**

Paul Nolan[1], Nerys Jones[2], Anne Jaluzot[3], Kenton Rogers[4], Naomi Zürcher[5], Maria Beatrice Andreucci[6]

[1]*The Mersey Forest, United Kingdom*

[2]*Nerys Jones*

[3]*Anne Jaluzot*

[4]*Treeconomics*

[5]*Naomi Zürcher*

[6]*Sapienza Università di Roma*

*nerys.jones@blueyonder.co.uk*

**Keywords**

GI-Val, itree, business, valuation, economics

There are more than 200 Business Improvement Districts (BIDs) operating across the United Kingdom. A BID is a business-led and business funded body formed to improve a defined commercial area.

Several BIDs in the UK have either already developed their green infrastructure plans or are currently looking at similar audits. The Victoria BID in London, was the first to carry out an audit and this has led to significant interest and investment in environmental improvements in the area. More recently 14 other London BIDs have completed their audits. The two Liverpool BIDs and Northwich BID in Cheshire, have also carried out their audit and are due to publish their Green Infrastructure Prospectus in summer 2016.

Victoria BID's Green Audit identified the importance of the urban forest. The population of mature trees, mainly London Plane (*Platanus* × *acerifolia*) providing a wide range of benefits for the BID area. Itree was used to assess the economic value of the urban forest. However, for the non-tree green infrastructure elements the GI-Val toolkit was used.

As part of the EU Cost Action IP1204 "GreenInUrbs", further work has been carried out to look at the use of itree and GI-Val.

The results showed that the itree provided more detailed data that could not only be used to establish the economic value of the urban forest, and inform detailed management planning. However, data capture was expensive and time consuming. GI-Val in contrast provided less detailed data on the green infrastructure resource, provided a wider range of tools and values, and took significantly less resource to gather and analyze data. GI-Val also was able to provide data on a wider range of green infrastructure typologies than itree. However, the results provided less accurate data on the economic value of the green infrastructure.

An important conclusion of the study is that the two models are complimentary and can be used in combination. GI-Val as a relatively quick, low cost, but less accurate model can provide indicative economic values, helping to justify further investment in more systematic and accurate itree assessments.

**Notes**

**Innovative green placemaking with participatory public lighting**

Kasper Rasmussen[1], Natalie Gulsrud[2]

[1]*Obscura, Denmark/Alexandra Institute, Denmark*

[2]*University of Copenhagen, Denmark*

*kasper@obscura.dk*

**Keywords**

Public art, urban green space, urban forests, place making, management

The aesthetic and democratic qualities of public art and light installations have been well documented. The role of intelligent light and art design in urban green spaces and forests is understood to a lesser extent. Intelligent light and art design broadly defined is non-static art that can be altered based on user interaction, weather, season, time of day, the number of people in the park, etc. The purpose of this presentation is to explore the role of intelligent light and art design in urban green spaces and forests in terms of their aesthetic and management value, specifically in light of current citizen involvement and broadening green governance trends.

In an age defined by sedentary lifestyles and technology driven activity, green space managers are challenged to make parks and urban forests relevant to all citizens. Temporary and permanent light and art installations provide an opportunity for green space managers to re-brand parks and urban forests through innovative imagery, attracting and activating new and diverse users. Participatory public art, specifically lighting, creates a setting of safety and playfulness attractive to children amongst other users. Storytelling, data collection and pure entertainment are other benefits of such interactive installations. Ultimately these instillations can lead to meaningful citizen engagement not only in the management of urban green spaces but also in green placemaking.

Covering the history of intelligent art and light design in public spaces, this project presents past and current examples of how participatory installations could add aesthetic and strategic value to green space management. The presentation concludes with a discussion about the implications of such lighting and art for theory, research, and practice.

**Notes**

**Did not attend! Urban forestry – a wave of green amid concrete jungles**

Rohit Sharma, Padmapriya Vedantam

*Indian Institute of Plantation Management Bangalore, India*

*rohit1189sharma@gmail.com*

**Keywords**

Urban forestry, resilient cities, climate change, carbon sequestration

Climate change is a global phenomenon. Urbanization clubbed with rapid climate change has cast a dark spell on this planet. Lack of knowledge and concern regarding measures to tackle climate change will leave the planet overwhelmed with environmental challenges. The distance between city inhabitants and nature is on the increase as 50% people are now living in less than 3% of the earth's urbanized terrestrial surface. WHO suggests ensuring, at least, a minimum availability of 9 $m^2$ green open space per city dweller.

The role of urban forests in ameliorating urban habitats and improving the quality of life is significant. The services provided by trees in the socio-ecological ecosystem are immense and invaluable (carbon sequestration, mitigation of urban heat island effect, microclimate regulation, etc. to name a few). Governments, educational institutions, local bodies, and residents are the key players in the greening of urban cities. The need for urban forestry is to be planned, integrated and systematic. Systematic management entails regulated tree management, operations such as planting, pruning and felling needs to be conducted in an organized manner at the appropriate time. Cities have to be resilient in tackling climate change through urban forestry, therefore, innovations on governance of urban systems is need of the hour. Policy and science should emphasize the critical necessity of green areas within urban socio-ecological systems.

This paper will analyze the status of urban greenery in some of the Indian cities – Bangalore, Mumbai, and Chandigarh using secondary data. Furthermore, this paper will strive to suggest strategies for connecting science to decision-making aimed at creating multifunctional landscapes to enhance urban resilience and human well-being.

**Notes**

**Did not attend! Analysis of the evolution of holm oaks under preventive phytosanitary treatments in peri-urban areas for sports**

Claudia García-Ventura, Concepción González-García, Maria Jesús García-García

*Universidad Politécnica de Madrid, Spain*

*concepcion.gonzalez@upm.es*

**Keywords**

Oak decline, management, phytosanitary treatments, peri-urban forest, climate

This work analyses the evolution of the defoliation degree on a native holm oak wood (*Quercus ilex* subsp. *ballota* (Desf.) Samp.) located in a golf course in Madrid (Spain). This peri-urban green space, whose trees are protected, is subject to high humidity, earthmoving and other anthropic actuations which may affect their root system and promote the development of pathogenic fungi. Since 2011, there have been taking preventive phytosanitary treatments on roots and leaves with natural and biological products with low environmental impact. These products help to stimulate the natural defenses of trees. The selected tree for products application includes individual trees with different degrees of defoliation in several locations to observe the effectiveness of the products. Given the economic and time difficulties to plan and design a better experiment, a descriptive analysis of the observations is carried out in the trees between the springs of 2011 and 2015. The result of evolution of each individual treaty takes into account the influence of the climate. In recent years, there has been a rise in temperatures and the duration of the drought, which has negative effects on the vigor of the trees. During the period under review it has been studied the relationship between variation in temperature and rainfall and the rate of defoliation. The results indicate that during the analyzed period, 65% of treated oaks maintain their initial state, 15% improved and 20% worsened their conditions. It is concluded that the treatments applied are a valuable tool to maintain the vitality of the oaks.

**Notes**

**Did not attend! Our vision of a resilient urban forest**

Ross Weddle, Jane Carlsen, John Meehan, Bruce Collinson, David Houghton, Peter Wilkinson, Nick Grayson, Paul Nolan, Iain Taylor, Tom Wild

*Urban Forestry and Woodland Advisory Committee Network*

*ross@issociates.co.uk*

**Keywords**

Urban forest vision

Our vision for the urban forest is:

- Where the many benefits of trees are recognized and invested in.

- Where the urban forest is integral to the form and function of all our urban areas.

- Where it creates healthy and economically successful communities and lovable places for people and wildlife.

It will be considered as critical infrastructure for urban areas, on a par with utility, transport and the built environment. Infrastructure does not appear by chance; it is planned for, designed, created, managed and maintained. The urban forest is no different.

It will be viewed and managed as a whole and not considered as separate trees. Trees in parks, streets, private gardens, public land, highways and urban woodlands will all contribute to the urban forest.

It will inspire collaboration and creativity to ensure that the urban forest thrives and expands in a world of increasingly complex institutional, ownership, stakeholder and financial arrangements.

**Notes**

**Can urban trees provide reliable proxies for climate reconstruction?**

Saša Zavadlav[1], Simon Poljanšek[1], Lena Marion[2], Tomislav Levanič[1]

[1]*Slovenian Forestry Institute, Slovenia*

[2]*Tisa d.o.o., Slovenia*

*sasa.zavadlav@gozdis.si*

**Keywords**

Urban trees, tree ring width, stable isotopes, Ljubljana

Tree cores and stem disks of catalpa (*Catalpa* sp.), poplar (*Populus* sp.), horse chestnut (*Aesculus hippocastanum*), honey locusts (*Gleditsia triacanthos*) and pedunculate oak (*Quercus robur*), growing in parks and streets of the City of Ljubljana (Slovenia), were collected to see if they hold reliable proxies for climate reconstruction. The samples were analyzed for their tree-ring width (TRW) and stable carbon ($\delta^{13}C$) isotopic composition (and oxygen ($\delta^{18}O$) for oaks) using dendrochronological and stable isotope analytical methods. The longest chronologies with sufficient number of samples for TRW analysis were built for horse chestnut (1812-2013) and oak (1934-2013). Although catalpa, poplar and honey locust chronologies had insufficient sample size for TRW analysis, and did not exceed 60 years in length, individual tree TRW chronologies within the species matched well and were analyzed for $\delta^{13}C$. Measured isotopic ratios were compared to climate data (air temperature, precipitation, relative humidity, evapotranspiration index and sunshine hours) collected at the Ljubljana meteorological station. No clear climatic signal for TRW or stable isotope data was found in sampled trees, except for the horse chestnut TRW and oak $\delta^{18}O$ chronologies. Horse chestnut showed a clear 3-month evapotranspiration signal ($r = 0.62$) for early summer period. The $\delta^{18}O$ chronology of oak trees, growing on the southern slopes of the Rožnik Hill in Tivoli Park, show a positive correlation with air temperature ($r = 0.52$) and negative with relative humidity ($r = -0.48$). This is most likely related to evaporative enrichment in the leaves, responding to the openness of the stomata during $CO^2$ assimilation and water vapour loss. Although proxies in urban trees appear to be influenced by non-climatic factors (nutrient and water availability, air pollution etc.), trees, growing in parks and relatively undisturbed areas within the city (such as oak and horse chestnut in our case), potentially hold valuable information on climate conditions at the time of their growth.

**Notes**

**Did not attend! "It's a walk in the park" Parallel green routes reduce personal exposure to traffic noise**

Jack P. Lodge-Patch[1], Francesco Pilla[2], Eoin A. King[3], John Gallagher[1,2]

[1]*Bangor University, United Kingdom*

[2]*Trinity College Dublin, Ireland*

[3]*University of Hartford, USA*

*gallagj2@tcd.ie*

**Keywords**

Green infrastructure, noise pollution, city parks, personal exposure, parallel routes

The urbanization of cities generates environmental nuisances and stressors, such as escalating noise levels. Road traffic continues to be one of the prevalent causes of urban noise pollution, as is known to detrimentally affect the wellbeing and health of city dwellers. Planners are tasked with enhancing our city landscape, and enhancing green infrastructure (GI) is encouraged, as it can lower noise levels and generally improves the quality of life for people living in an urban environment. This case study examined four paired routes around Hyde Park in London, a roadside path and a parallel green path through the park, which was available to all pedestrians in the area. The findings aim to answer two questions "can taking a parallel path through a city park reduce personal exposure to noise pollution?" and if so "what impact does GI have on any potential difference in noise levels?" This work compared noise measurements (LA, eq) for an individual walking along the outside of the park to an individual simultaneously walking on a parallel route inside the park. The results found that noise levels along the park routes were on average 6.9 dB(A) lower than those experienced along roadside routes. To examining the impact of vegetation on noise levels, GI was classified using a vegetation density index (VDI) scorecard along each route. A simple regression analysis that compared relative noise level between parallel points along the routes, identified the VDI as an impacting factor in addition to the distance between the points. The findings from this study suggest that personal exposure to noise pollution from road traffic can be reduced for those with access to an alternative green route. Furthermore, increasing the VDI in some locations may also help reduce the encroachment of noise into our urban green spaces and improve conditions for pedestrians on green routes. City parks offer a natural way of segregating pedestrians and road-traffic, and even in a fast-paced city these green routes add no length or time to a pedestrian's journey, they simply offer a moment of tranquility.

**Notes**

**Did not attend! Economic value of recreational experience in Swedish forests: evidence from two urban forest areas**

Eugene Ejike Ezebilo

*Swedish University of Agricultural Sciences, Sweden*

*eugene.ezebilo@slu.se*

**Keywords**

Contingent valuation method, ecosystem services, recreation, urban forest, willingness to pay

The contributions of ecosystem services that are not traded on markets to human welfare are often undervalued due to that their economic values are not well known by people. Recreational experience in Swedish forests is an example of a service not sold in markets. This is because Sweden has policy of "Right to Public Access" which makes forests free for recreation. Accounting for economic values of the service can help in making decisions that enables efficient use of natural resources. This paper reports a study on preferences for recreational activities, visits and willingness to pay (WTP) for recreation in Torup and Delsjön Forest Areas located in Malmö and Göteborg, respectively using the contingent valuation method. The data originated from a mail survey of Malmö and Göteborg residents, Sweden who were randomly selected from a national register and analyzed using descriptive statistics. The results showed that most visitors use Torup and Delsjön mostly for pleasure and exercise walks, jogging and picking mushroom and berries. The average frequency of visits to these Forest Areas was 74 times and 11 times annually for Delsjö and Torup, respectively. The visitors who engaged in walking with a dog were the most frequent to Delsjön (178 times) while it was game of golf for Torup (26 times). The visitors to Delsjön were willing to pay 2504 SEK (295 US$) annually whereas it was 1837 SEK (216 US$) for Torup. Visitors who engaged in in swimming at Delsjön had the highest WTP (6180 SEK = 727 US$) and it was picnic (5686 SEK = 669 US$) for Torup. The findings suggest that people who visit Delsjön for swimming will pay more for recreation there and it was picnic for Torup. This implies that visitors to Delsjön have lesser opportunities for swimming and those to Torup have lesser access to facilities for picnic. Thus it is important for the recreational forest managers to consider improving facilities associated with swimming in Delsjön and picnic in Torup. The findings will contribute to the planning and allocation of resources among competing recreational activities in Delsjön and Torup Forest Areas, respectively.

**Notes**

**The effect of nature assisted therapy on psychiatric patients: case study of Belgrade, Serbia**

Maja Vujčić[1], Jelena Tomićević-Dubljević[1], Dušica Lečić-Toševski[2], Olivera Vuković[2], Oliver Tošković[3]

[1]*Department of Landscape Architecture and Horticulture, Faculty of Forestry in Belgrade, Serbia*

[2]*Department of Psychiatry, Faculty of Medicine in Belgrade, Serbia*

[3]*Department of Psychology, Faculty of Philosophy in Belgrade, Serbia*

*maja.vujcic@yahoo.com*

**Keywords**

Urban nature settings, horticulture therapy, mental health, psychiatric patients, city of Belgrade, Serbia

Accelerated technological development overshadowed the ecological principles of life which prevented parallel biological, mental and social adaptation. The socio-economic crisis in Serbia and its urban centers, with a number of acute and chronic stressors, as well as years of accumulated trauma have certainly affected the mental health particularly for a vulnerable population, increasing in the absolute number of people with depression, stress and psychosomatic disorders. On the other side, there is considerable evidence of restorative effects of nature assisted therapy and that persons who were exposed to the settings with plants in contrast to the built environments, had lower levels of negative emotions and reported higher levels of positive feelings. Relying on similar studies that have been carried out and relatively unexplored area of Belgrade, when it comes to nature assisted therapy, this study was conducted in collaboration with Faculty of Forestry, Institute of Mental Health and Botanical garden in Belgrade in order to understand how spending time in urban nature settings can improve mental health. The participants were psychiatric patients (n=30) users of the Day hospital of the Institute who were randomly selected into study and control group and self-tested for depression, anxiety and stress before and after the intervention using a DAS21 scale. During the intervention period, the study group stayed in Botanical garden and participated in the program of horticulture therapy. In order to exclude the possible "special treatment'', the control group has been included in occupational art therapy while continued to receive conventional therapy. The results of this study indicated that nature assisted therapy had a positive influence on mental health of participants. The difference in the test results on the subscale stress before and after the intervention at the study group was $F1.28 = 5.442$ and $p < .027$. Also according to socio-demographic and clinical variables, the male participants were more anxious ($F1.32 = -2.848$; $p < .008$) and stressed ($F1.32 = -2.599$; $p < .014$) and participants with higher level of education were more depressed ($F1.32 = -3.531$; $p < .001$). The results of this study indicated that mental recuperation was possible and more complete when participants were involved in nature assisted therapy.

**Notes**

**Greener & cooler. Thermal comfort as ecosystem service in the urban forest of Florence, Italy**

Fabio Salbitano, Andrea Bettarini, Francesca Bottalico, Cristiano Foderi, Alessio Pratesi, Davide Travaglini

*GESAAF (Department of Agricultural, Food, and Forestry Systems), University of Florence*

*fabio.salbitano@unifi.it*

**Keywords**

Well-being, heat stress, shading effect, canopy microclimate, perceptual dimension of urban forest

Urban forests have a significant role on human health and well-being. Good Health, according to WHO, is “a state of complete physical, social and mental well-being”. An impressive number of studies have been conducted over the last two decades on the relationships between well-being and trees. Surprisingly, one of the least approached subject concerns the relationship between trees and thermal comfort, i.e. “that condition of mind which expresses satisfaction with the thermal environment”. This condition is crucial in Mediterranean cities, where the climate connotes a prolonged exposure to potential heat stress during summer. Comfort depends on Environmental (air temperature, relative humidity, air velocity, radiant temperature) and Personal (body mass, psycho-physical state, metabolic rate, activity) factors. The study focuses on how the urban forests of Florence are able to mitigate the summer heat stress, countering the effect of thermal discomfort, and how they represent comfortable places for the urban community. The study was carried out through microclimate measurements (weather stations and WBGT device) and coupled with structured interviews and on-site observations and mapping of the activities of urban park users. The findings on the significant influences of microclimate parameters and personal factors on the participants’ perceptions of outdoor urban places are discussed. The weather data were processed through the application of bioclimatic indexes while the WBGT data were processed by DeltaLog10© software to check the heat stress thresholds according to clothing equipments and physical exercise. The results show that under tree cover the heat stress thresholds were not overtook ever while in full sun conditions severe or even dangerous discomfort values have been registered. The interviews highlighted that the thermal comfort was perceived as decisively higher under tree cover. The managed urban forests are felt as more comfortable and as areas where the well-being is greater. The perception by the users of Florentine urban parks, is that the green areas are "relaxing" places, “cooler” when compared to the neighborhoods where they live. These results were confirmed by the observation and mapping of the activities carried out by the urban forests users even in the hottest days of the Mediterranean summer.

**Notes**

**Creating an ecodiverse indigenous urban woodland embedded in compact urban milieu**

C.Y. Jim

*University of Hong Kong, Hong Kong S.A.R. (China)*

*hragjcy@hku.hk*

**Keywords**

Indigenous urban woodland, urban ecology, urban green infrastructure, ecosystem service, urban biodiversity

Nature can be preserved or created in cities. Due to grave shortage of easily developable land, urban growth in Hong Kong has brought an ultra-compact form with obliteration of nature in built-up areas. The original tropical monsoon semi-evergreen forest vegetation has been eliminated after a millennium of sedentary agricultural and then urbanization impacts. The urban fabric is characterized by meagre provision of urban green spaces (UGS) and deficient urban green infrastructure. The cramped urban environment calls for mitigation by high-quality nature-in-city ingredients. Instead of routine urban park design beset by manicured landscape, limited vegetation cover and excessive hard surfaces, some UGS sites can accommodate more natural vegetation with a complex biomass structure and high leaf area index. The urban woodland offers an alternative to inserting nature into the tight urban matrix to maximize ecosystem services and biodiversity. The innovative Zero Carbon Building site in Hong Kong, embedded in a dense built-up area, provided chances to install a pioneering native urban woodland. The ecodesign is based firmly on urban ecological concepts. It imitated the pertinent traits of the tropical native woodland, including species diversity, tree density, vegetation cover, closed canopy, vertical stratification, and interlocking crowns. Criteria were established to identify 44 native tree species supplemented by native shrubs. Besides biomass structure and morphology, the constituent ecosystem processes were fostered, such as energy flux, nutrient cycling and food-web formation, with a view to creating a closely-knitted, interdependent and self-sustaining ecological community. The native plants were accompanied by a prepared soil mix with native composition and properties to facilitate development into a mature woodland soil. Environmental benefits such as urban biodiversity enhancement, cooling, air cleansing, noise abatement and groundwater recharge would improve with progressive woodland ecosystem succession. Measures were developed to overcome problems in acquiring native trees of prescribed quality and quantity from the region's nurseries. The knowledge exchange project tested the scientific methods and furnished experience for similar projects in tropical cities. Examples of intra-urban afforestation in other cities are reviewed.

**Notes**

**Summary of the London Tree Officers Association *Ceratocystis platani* UK Protected Zone Status surveys 2014-2015**

John Charles Parker

*London Tree Officers Association, United Kingdom*

*john.parker@tfl.gov.uk*

**Keywords**

*Ceratocystis*, Plane, London, LTOA

*Ceratocystis platani*, also known as canker stain of plane or plane wilt, is an invasive fungal pathogen considered to be the most serious disease to affect the genus *Platanus*. Thought to have originated in the south-east of the United States, it is now established in Europe and has led to the death of substantial numbers of London and oriental planes, particularly in France, Greece and Italy.

Planes are an important urban tree species in the UK, particularly in London and the south of the country. Since 2014 the UK has held Protected Zone Status (PZS), ensuring that planes can only be imported from areas which have also been designated free of CSP. Maintaining PZS is dependent on demonstrating to the European Union that CSP is actively being looked for and is not present in the UK.

To help meet this requirement the London Tree Officers Association (LTOA) has been engaged by the Forestry Commission to undertake surveys for CSP, selecting 53 sites across London for inspection in 2014 and re-inspecting those sites in 2015. Surveys were undertaken on a voluntary basis by local authority London tree officers who had been trained by Forest Research to identify CSP and to use the Forestry Commission reporting tool TreeAlert to submit any suspected findings of the disease.

This presentation will describe the characteristics and symptoms of *Ceratocystis*, outline the methodology and findings of the 2014 and 2015 LTOA PZS surveys and assess the current status of the UK in relation to the disease. It will also describe proposals for future surveys, monitoring and management, including a summary of the ongoing collaboration between the LTOA and colleagues elsewhere in Europe in respect of this issue.

It will be delivered by John Parker, Transport for London Senior Technical Specialist – Arboriculture & Landscape, Vice Chair of the LTOA and author of the 2014 and 2015 LOTA reports.

**Notes**

**Wild urban forests and wood biomass landscape laboratories on former brownfield sites as contribution to resilient cities. Good practice Ruhr metropolitan area, Germany**

Renate Susanna Späth

*Ministry for Climate Protection, Environment, Agriculture, Nature Conservation and Consumer Protection Nordrhein-Westfalen; Düsseldorf, Germany*

*renate.spaeth@mkulnv.nrw.de*

**Keywords**

Wild urban forests, landscape laboratory, social integration, green infrastructure, networking

The Ruhr Metropol Region (North Rhine Westphalia) is the most densely populated multiple-city region of Germany. Its unique history reveals more than 150 years of industrial landscape development dominated by coal mining, steel and chemical industries.

After the decline of coal mining as well as steel industry the structural changes have had deep social impacts on the whole region, its inhabitants as well as on the reclaiming of large brownfield sites. Since 1989 the state government of NRW has supported the economic, social and cultural change. One of the main state-supported projects is the Emscher Landscape Park (ELP) as a consequence of the International building exhibition Emscher Park (1989-1999).

One small ELP based project concentrates on the wild urban forests on former brownfield sites as a new type of green infrastructure serving for social needs of the neighborhoods as well as biodiversity aspects in cities. Another project intends to integrate productive aspects in a biomass landscape laboratory as a new urban green serving resilient cities. The presentation will highlight the aims and pilot projects of this different new urban forests approach on brownfield sites in the City of Gelsenkirchen.

The importance of urban forestry and a vivid green urban infrastructure will be shown as well as their contribution to environmental remediation, learning and education, health, recreation and biodiversity. The presentation will address the strong need for cooperation between land owners, land users, urban planners and civil society in order to reach the aim of a better urban green future.

The presentation might be accompanied by a video produced by the European Environmental Agency (EEA) in 2010, the International Year of Biodiversity.

**Notes**

**Social mobilization of citizens on urban forestry: Canadian experiments at the neighbourhood block scale**

Stephen Richard John Sheppard

*Collaborative for Advanced Landscape Planning, UBC, Canada*

*stephen.sheppard@ubc.ca*

**Keywords**

Community engagement, citizen science, climate change, community mapping, greenspace management

Urban forests and citizens are facing new and more intense challenges, including climate change threats to populations and green infrastructure, continuing urbanization and density, shrinking budgets for local governments tasked with managing the urban forest, and growing public expectations of inclusion and involvement in decision-making. These trends mean that we will likely need many more engaged and informed citizens to play a role in maintaining a healthy urban forest. There are examples of successful volunteer programs, though these often do not reach the majority of residents who control the private portion of the urban forest, but who may be less interested in the urban forest. How can we scale up and deepen citizens' engagement in urban forestry? Research shows we need more than information, communication, and education to change perceptions and behaviour: it requires invoking social or peer pressure, place attachment, experiential (hands-on) learning, reinforcement by trusted third parties, and use of compelling visual learning tools. Citizen science or crowd-sourcing of data offers expanded opportunities for engagement, using mobile technology and interactive online datasets.

Precedents for community-based activities include local food-tree planting programs and mapping of urban trees by Ontario citizens with the 'Neighbourwoods' program. Many engagement initiatives address community, neighbourhood, or individual household scales, but the residential block scale is seldom targeted, despite some obvious advantages, such as collective action with familiar neighbours; high visibility of any actions; convenience of close proximity; and maximal place attachment.

To address these needs, researchers in British Columbia have initiated several experiments to develop and ultimately test a Do-It-Yourself (DIY) toolkit for citizen engagement on urban forestry and climate change at the residential block level. In several communities, prototypical toolkits have been developed with activities arranged in a basic 4 step framework: starting a conversation; inventory and mapping; future visioning; and action planning. This presentation will demonstrate various ways that such block-scale interventions can be both fun and motivational, employing social events, social media challenges and competitions, community mapping of canopy with Google Earth, simple landscape visualization, and ultimately onsite actions. Directions for further evaluation research will be outlined.

**Notes**

**Nature takes over: green change in Ploiesti, Romania**

Pieter Jacobus Wieringa

MKBT: Make Better, Romania

pieterwier@hotmail.com

**Keywords**

Unofficial, green, change, Ploiesti, local development

The City of Ploiesti is the center of oil exploitation and oil refining in Romania, completely surrounded by oil and petro-chemical industries. At the beginning of the 20$^{th}$ century, when Romania was the third largest oil producer in the world, the city counted more than 10 oil refineries. Today only four of them are operational. Vast industries lay abandoned, urban air quality is poor and greeneries are few.

The official green space per capita is 12,4 m$^2$, well below the Romanian average and nowhere near the minimum of 26 m$^2$ per capita required by the European Union. Unofficially, however, much progress has been made. Slowly but steadily nature has managed to reclaim the numerous brownfields. The well-developed railway infrastructure was a facilitator in bringing plants and trees to areas of economic decline. The railways functioned as a sort of a transportation highway for exchange of genetic materials between the rural and urban areas. The establishment of these urban wilderness woodlands has resulted in a near perfect unbroken greenbelt encircling the city. One of the most important features of green infrastructure is connectivity. Connectivity is what enhances genetic exchange and allows fresh air to reach the interior of cities where urban heat islands are most prevalent.

Even though most of the green wilderness woodlands are not open to the public, a lot of them are surprisingly accessible. Recently, people have started to notice the sheer scale of green change and are seeing opportunities for alternative use – recreation, adventure, parkour and skateboarding. It provides a space for wilderness experience and a welcomed contrast to the harsh and chaotic concrete urban environment. Additionally, much of the greenbelt is utilized for informal agriculture, fire wood harvest and animal husbandry. Although this network of a greenbelt, brownfields, green rail corridors and existing parks is not managed, studied or even identified, it does not mean it isn't there. It contributes significantly to urban greening, resilience and the quality of life.

**Notes**

**Socio-environmental justice: diversity in access to and benefits from green infrastructure and urban forests in Europe**

Rik De Vreese[1], Liz O'Brien[2], Thomas Panagopoulos[3], Erdogan Atmiş[4], Anton Stahl Olafsson[5], Tuija Sievänen[6], Michael Brennan[7], Tessa Hegetschweiler[8], Sjerp de Vries [9], Maren Kern[10]

[1]*Vrije Universiteit Brussel, Belgium*

[2]*Forest Research, UK*

[3]*University of Algarve, Portugal*

[4]*Bartin University, Turkey*

[5]*Copenhagen University, Denmark*

[6]*Natural Research Institute Finland (LUKE)*

[7]*University College Dublin, Ireland*

[8]*Swiss Federal Institute for Forest, Snow and Landscape*

[9]*Wageningen University & Research (WUR), Netherlands*

[10]*Bern University of Applied Sciences, Switzerland*

*rik.de.vreese@vub.ac.be*

**Keywords**

Social equity, recreation, social distribution, cultural barriers

Green Infrastructure (GI) and Urban Forests (UF) provide important ecosystem services for urban and peri-urban populations. However, particular sections of society such as the income deprived, the disabled and ethnic minority groups may not have the same opportunities and access to GI and UF that more affluent sections of society enjoy. They may also face exposure to more environmental risks and benefit less of the ecosystem services provided by UF and GI.

To understand why, researchers have turned to the perspective of socio-environmental justice combining social justice (every individual is entitled to fair and equal treatment and equal access to rights and benefits) and environmental justice (the right to a clean environment, equally shared benefits from ecosystems and fairly distributed negative impacts of nature).

The presentation will focus on socio-environmental justice related to cultural ecosystem services (CES). We will outline which sections of society (in a range of different European countries) have access to and benefit from accessing urban GI and wider GI and, more importantly, which sections of society do not have this opportunity. We will elaborate on barriers for accessing and using urban green space for less privileged groups, with a special attention to how cultural norms and traditions are related to use of GI

and UF. Experiences from several European countries show how newly developed urban green spaces are less used than expected by social groups for which high needs for green spaces were defined. This demonstrates how studies towards distributional socio-environmental justice, that comprise the majority of studies related to use and access of urban green space, are probably not tapping into the major issue: traditional urban green space is not in line with the expectations of the targeted users.

Finally, we will discuss the issue of eco-gentrification, or how introducing more accessible green areas into the urban tissue for underserved communities can lead to thriving those communities out of their neighbourhoods.

The study has been conducted within the framework of the COST-action GreenInUrbs (FP1204).

**Notes**

**Employing a latent class model to segment public preferences over an urban forest's recreational setting**

Anže Japelj[1], Donald Hodges[2], Andrej Verlič[1], Luka Juvančič[3]

[1]*Slovenian Forestry Institute, Slovenia*

[2]*University of Tennessee, Department of Forestry, Wildlife and Fishery, Tennessee*

[3]*University of Ljubljana, Biotechnical Faculty, Slovenia*

*anze.japelj@gozdis.si*

**Keywords**

Urban forests, choice experiment, recreation setting, preferences, willingness to pay

Urban forests provide a range of ecosystem services for society in urbanized environment. Those are opportunities for recreation, which enables dwellers to recover from daily stress, to physically exercise and to enjoy the scenery of the forest. Recreational habits differ by expectations, ethnicity, social status, thus existence of different interest groups is to be expected. This variety needs to be addressed within forest management to mitigate conflicts among different stakeholders (forest owners, cyclists, joggers and wildlife watchers). This is also the case for Golovec urban forest in the capital of Slovenia (Ljubljana), which is a 675 hectares large area of mixed forest, mostly (>75%) privately owned. It is a popular outdoor recreational area.

In this research, we addressed the preferences of Ljubljana's citizens towards different recreation-related attributes of Golovec urban forest. Those were infrastructure-related (trails [in kilometers], waymarks and information boards [either maintained or not]) and forest stand-related (outstanding trees, forest openings [both in % of either of all trees or the total area]). We used a choice experiment-based questionnaire, which was administered to 263 respondents (between July and August 2013) and data was analyzed by a latent-class logit model.

A 2-class model was estimated. We have defined the first class of respondents as "change rejecters" as they expressed negative preferences for having more paved trails and for yearly payment. However, they indicated having more outstanding trees as a positive change. Respondents in this class in comparison to those in the second class seem to be older, are less likely to live in the city, are also less likely to visit forest frequently, and are less likely to visit forests often to walk a dog and to pick forest fruits (mushrooms, berries and chestnuts). On the other hand, respondents in second class ("change supporters") expressed positive preferences for having waymarks and information boards maintained. They also expressed positive preferences for having more forest openings, but only up to 2,3% after which utility starts to decrease. Similarly, as those from the first class, they have also expressed negative preferences for having to pay for changes in the attributes.

**Notes**

**Disaster management in urban forest**

Jurij Kobe[1], Rok Havliček[2]

[1]*City of Ljubljana, Slovenia*

[2]*Slovenia Forest Service*

*jurij.kobe@ljubljana.si*

**Keywords**

Ice storm, accessibility, salvage logging, forest ownership

An ice storm hit Slovenian forests in February 2014. Urban forests in Ljubljana were among the most damaged in the country. Slovenia (public) Forest Service (SFS) prepared a restoration plan focusing on the accessibility for the salvage logging. The City of Ljubljana (MOL) in cooperation with SFS, financed and enabled the beginning of intervention cleaning on forest roads in the popular recreation area of Šmarna gora Hill. There, the local community and the majority of landowners assured their support. Cooperation in forest areas closer to the urban core was not that efficient.

Due to important cultural ecosystem services MOL decided to invest additionally in the restoration through the public procurement system, mainly for reconstruction of forest roads and construction of skid roads. The main purpose of the cleaning of forest roads was to assure accessibility to the damaged forests to the owners and to promote efficient salvage logging.

In the continuation MOL and SFS focused on marginal, very damaged forest areas where many negative elements, such as multiple and extremely fragmented forest ownership, very long harvester and skid roads, no cutting for decades, prevented the beginning of restoration. To facilitate the process, MOL and SFS organized a workshop with an aim to form landowners association.

Main characteristics of the restoration area: 12 ha of mature European beech forest with scattered Norway spruce, pedunculated and sessile oaks and Sweet chestnut; 1.500 – 2.000 $m^3$ of wood to be logged out, 82 landowners invited to participate in the workshop, 49 land parcels, 61 different (co)owners, 25% of forest was a property of more than 3 co-owners, average parcel size was 2.600 $m^2$ and the smallest one was 200 $m^2$. And no cutting interventions in the last 30 years.

We received less than 25% of the forest landowners, although all participants were in favour of the joint restoration project. Because of the exceptional effort of all involved parties we succeeded to reach a great majority of forest landowners and also obtained necessary permits for joint implementation with a selected contractor. We have continued with similar projects on another two locations where landowners' responses were alike.

**Notes**

**Nature capital Urban Forest**

Astrid Hamm

*Citybranchings, Germany*

*a.hamm@citybranchings.com*

**Keywords**

Nature capital, bio economy, tangible value

Germany's Bio Economy Strategy, like many other planning papers on sustainable development, is talking about more sustainable methods when extracting natural resources. Even though forest management, amongst many other fields, is included in strategies for bio economy related to the financial gain by timber, most strategies do not yet acknowledge the economic role of urban forests and their impact on natural resource management. Exploitation of natural resources, for example wind and water, can be converted into electricity directly available to our society. Therefore, they are considered to be more tangible. They can also be easily quantified in monetary values and adapted to our economic system. Monetary evaluation of urban forests and trees has so far been more difficult. This being due to the fact that many services provided by urban forests appear to be rather intangible. In recent years monetary valuation of ecosystem services provided by green infrastructure has become a significant aspect for financial evaluation and appreciation of Urban Forests as part of our natural capital. Especially regarding numerous beneficial impacts provided by urban forests and trees to our society through mitigating increasingly negative effects of climate change. On a global level, the programme "i-tree eco" by USD Forestry Services is spreading worldwide. With this programme, economic gains of ecosystem services can be determined and integrated into economic budgets. But most of these have – so far – been taken for granted by our society and haven't been part of our economic system. However, there is a growing movement of towns and cities recognizing the significant role of urban forests also in financial terms. The nature capital Urban Forest needs to be included in political and economic strategies worldwide. Several approaches of including ecosystem services provided by Urban Forests in different countries are presented and discussed to inspire different approaches to our common economic systems. Nature capital should become an equal share in our financial economic system.

**Notes**

**Depreciated woody biomass of urban forests as the source of high value compounds**

Viljem Vek, Ida Poljanšek, Jaka Levanič, Primož Oven

*University of Ljubljana, Biotechnical Faculty, Department of Wood Science and Technology, Slovenia*

*primoz.oven@bf.uni-lj.si*

**Keywords**

Urban forest, Scots pine, depreciated wood, valuable compounds

Urban forest of Rožnik, located in Ljubljana, was heavily affected by devastating sleet in February 2014, producing large quantities of severely injured and fallen trees. Among tree species which heavily suffered was also Scots pine (*Pinus sylvestris* L.). Wood of broken Scots pine trees has very low market value and is frequently used only as a raw material for producing cellulose. However, our objective was to examine the potential of depreciated wood of severely injured and broken trees of Scots pine as source for high added-value compounds, e.g. natural fungicides. Phenolic compounds are known as such, which have the primary role as chemical defense substances against different fungi and bacteria, insects and plant-eating animals. For the purposes of present investigation, samples of sapwood, heartwood and knotwood of broken Scots pine trees were suitable prepared and extracted. Phenolic compounds were leached out from wood, successively, with cyclohexane and acetone. Extracted compounds were identified and quantitatively evaluated with a HPLC-PDA instrument. Characteristic phenolic compounds of Scots pine wood, i.e. pinosylvins, were tested for the fungicidal effect against white- and brown-rot fungi. Our investigation showed the applied extraction method as the quick and simple way for the extraction of phenolic compounds with fungicidal potential. Chemical analyses demonstrated that bases of living and dead branches represent rich source for recovery of phenolic compounds. Wood of broken crown tops can also be used for the extraction of low molecular compounds. Our investigation clearly demonstrated that wood extractives of Scots pine possess antifungal properties. However, we demonstrated that depreciated woody biomass of urban forests is the relevant source of high value-added compounds. Recovery of these compounds represents alternative and innovative exploitation of urban forests wood stock.

**Notes**

## Poster presentations

### Integrating the connectivity of urban forests in the evaluation of urban planning process in Romania

Irina Iulia Năstase, Mihai Răzvan Niță, Diana Andreea Onose, Alexandru Athanasios Gavrilidis, Denisa Lavinia Badiu

*University of Bucharest, Faculty of Geography, Romania*
*nastase.irina90@yahoo.com*

**Keywords**

Urban forests, connectivity, multi-criteria analysis

Urban areas are becoming more mixed in land use terms and therefore urban forests are increasingly considered important elements of the urban green infrastructures network. Their benefits are widely acknowledged and efforts are being made to improve the management of these green resources in urban areas. One of the most essential documents in urban planning is the city's master plan which defines the development directions and is the main source of data for this paper.

This study aims to assess how the urban planning process can influence the connectivity of urban forests and the green infrastructures network. The methodology consists in applying a multi-criteria analysis using indicators such as edge density, distance to urban parks, distance to public transportation stations, pedestrian accessibility, and the built up increase rate to four Romanian cities which represent different ranks in the urban network hierarchy: Bucharest – the capital city, Brasov – important urban growth pole, Sibiu – European Cultural Capital in 2007, and Moldova Nouă – a small formal industrial city. The domains which were evaluated are: structural connectivity, potential connectivity, land use management, and socio-economic aspects.

The results highlight the importance of integrating urban forests into the green infrastructure network by providing accessibility through public transportation and also connections to other green spaces such as urban parks and gardens. Understanding the potential of urban forests in a city's development helps in creating sustainable urban landscapes and increases the quality of life.

**Notes**

**Rainfall interception in urban forests is related to stand structure**

Janez Kermavnar, Urša Vilhar

*Slovenian Forestry Institute, Slovenia*
*janez.kermavnar@siol.net*

**Keywords**

Throughfall, stemflow, tree species composition, canopy cover, rainfall intensity

Urban forests, as one of many forms of green infrastructure, provide several important ecological ecosystem services. Forest ecosystems in urban areas represent quantitative and quality filter layer for rainwater. With the interception and retention of precipitation in tree canopies, forests are capable of regulating throughfall and mitigating soil erosion processes or related negative effects of intense weather phenomena (water accumulation, stormwater runoff, flooding etc.).

The study was carried out in an urban transect from the mixed forest in the city center towards a riparian pine forest and the floodplain hardwood forest over a six-year period (2008-2013) in the City of Ljubljana. Bulk precipitation in open and throughfall were measured with fixed rainfall collectors in each forest. Stemflow was estimated from relevant literature review.

Results show that average interception was the highest (18,0% of bulk precipitation) in mixed forest, mainly due to its dense canopy cover, high share of coniferous evergreen trees with wider crowns and larger tree dimensions (height, diameter). Riparian pine forest exhibited the lowest interception (3,9%). In the floodplain hardwood forest, its average share was 7,1%. The proportion of rainfall interception in riparian pine forest and in floodplain hardwood forest was evidently higher during the winter, compared to mixed forest, where it was higher in summer. Rainfall interception and throughfall were strongly influenced by forest stand structure and its tree species composition. In addition, rainfall intensity was also important for seasonal partitioning of canopy interception.

A better understanding of interception processes in urban forests is needed to assist managers interested in managing urban forests for hydrological benefits.

**Notes**

**Forest railways as a special vehicle of urban forestry in Hungary**

Katalin Tuba, Géza Kelemen

*University of West-Hungary, Hungary*
*tuba.katalin@emk.nyme.hu*

**Keywords**

Well-being tools, special lines, scheduled railways

The narrow-gauge forest railways had an 8000-km-long line in Hungary in their golden age but now they have only 473 km. The old steam locomotives have been changed with diesel locomotives and nowadays environmental-friendly hybrid-powered locomotives are spreading everywhere in this sector. The forest railway was started in order to transport wood at the end of the 19$^{th}$ century. It reached its largest extension and the highest capacity of wood delivery in the 1930s. Heavy duty trucks squeezed out the forest railways from the wood transport market in the 1980s. Now these railways are used to deliver tourists in the urban forest regions with the exemption of two lines, which play a role in public transport and wood transport.

In our work we investigated: 1) What kind of role have the narrow-gauge forest railways in the well-being of urban forestry? 2) How are this type of railway and other well-being tools connected?

Hungarian forest railways predominantly belong to state-owned forestries (Ltd-s), but four of them have municipal maintenance and two of them are operated by the national railway company. Numerous well-being tools belong to the forest railway lines like playgrounds, gymnastics fields, forest schools, tourist and thematic paths. There are scheduled railways and there are some special lines such as services for Santa Claus, Hoar-frost, Midsummer's day, the Bell of deer. There is special line in Budapest where the railway has been operated by children since 1948.

The programs already begin in the town, the train moves through the forests at a low speed and it reaches remote places, which are often not approachable via public roads and the adventures continue at the final destination. So forest railways can be regarded as an extended arm of urban forestry.

**Notes**

## Winner of the #EFUF2016 blog competition

**Nature takes over: unexpected green change in Ploiesti, Romania**

***Pieter Wieringa***

The City of Ploiesti is the center of oil exploitation and oil refining in Romania, completely surrounded by oil and petro-chemical industries. At the beginning of the 20th century, when Romania was the third largest oil producer in the world, the city counted more than 10 oil refineries. Today only four of them are operational. Vast industries lay abandoned (brownfields), urban air quality is poor and greeneries are few.

Officially, Ploiesti only provides each and every inhabitant with 12,4 $m^2$ of public functional green space, while the Romanian average of urban green space in cities with more than 100.000 inhabitants is 18 $m^2$ per capita [1]. Both are well below the minimum of 26 $m^2$ per capita required by the European Union.

However, it is not as simple as that and the numbers can be deceiving. Working as a forest engineer on the new master plan for this heavily industrialized city, I realized that Ploiesti is actually very green indeed! The oil refineries and supporting chemical companies that have gone bust in the early 90s have turned green. In the 25 years of abandonment, plants and trees have become quite successful in reclaiming the lands.

Wild urban woodland in southern Ploiesti

Nature has created urban wilderness woodlands or “nature of the fourth kind” as Ingo Kowarik and Stefan Körner named them so fittingly [2]. The well-developed railway infrastructure was a facilitator in bringing

plants and trees to areas of economic decline. The railways functioned as a sort of a transportation highway for exchange of genetic materials between the rural and urban areas.

The new wild urban woodlands follow the railways that encircle the city and in many cases connect to the adjoining brownfields. As a consequence, a near perfect unbroken greenbelt of 10 to 600 meters wide has emerged. The greenbelt is highly variable along its route. Its vegetation is in different stages of development and runs through mostly brownfields in the South, towards watershed and residential areas in the north. Furthermore, a South to North-West green corridor, lining the main boulevard, connects the city center with the greenbelt (see map). One of the most important features of green infrastructure is connectivity. Connectivity is what enhances genetic exchange and allows fresh air to reach the interior of cities where urban heat islands are most prevalent.


Map of accidental green infrastructure in Ploiesti

Although this network of a greenbelt, brownfields, green rail corridors and existing parks is not managed, studied or even identified, it does not mean it isn't there. It contributes significantly to the greening and the quality of life in the city by providing advantages such as: pleasant micro-climate, urban biodiversity, fresh (cool) air, shade, pollution uptake, carbon sequestration, etc.

Even though most of the green wilderness woodlands are not open to the public, a lot of them are surprisingly accessible. Recently, people have started to notice the sheer scale of (green) change and are beginning to see opportunities for its alternative use – recreation, adventure, parkour and skateboarding. It provides a space for wilderness experience and a welcomed contrast to the harsh and chaotic concrete urban environment. Additionally, many of these areas are used for pastoral activities and urban agriculture, further adding to urban resilience.

Urban forestry in Romania is in its infancy. There are no present discussions taking a more holistic view at urban green spaces in Ploiesti. Based on field research and existing information I was able to create the above map and gather data.

Locals skateboarding at Ploiesti Triaj (Photo: Fritz Schiel)

The greenbelt that surrounds the city occupies an area of approximately 7,2 $km^2$. Together with other green spaces and parks the total surface of green infrastructure amounts to 13,26 $km^2$. In other words, 22,7% of the city is covered by greeneries. In total, the residents of Ploiesti will now find there is 63,1 $m^2$ per capita of green space, out of which 12,4 $m^2$ per capita of public functional green space. According to a previous study on urban green space coverage in Europe, these numbers rank Ploiesti higher than the Romanian average and the neighboring eastern European countries [3].

Accidental as it may be, could there be a way to integrate and protect these valuable resources in the future? How to raise awareness for something that is associated with unemployment, economic decline and mismanagement? Perhaps through temporary use of small physical impact, such as creating wilderness parks, community food forests or allotment gardens (urban agriculture)? What do you think the alternatives for Ploiesti's green urban future can be?

[1] Green space index Romania: Chiriac D., C. Huma, M. Stanciu, 2009, Urban Green Spaces – A Problem of Contemporary Urbanization, Research Institute on the Quality of Life (in Romanian).

[2] Wild Urban Woodlands: New Perspectives for Urban Forestry, 2005, Ingo Kowarik and Stefan Körner, (Eds.) 1-32.

[3] The scaling of green space coverage in European cities, 2009, Richard A. Fuller, and Kevin J. Gaston.

***Pieter Wieringa*** *is passionate about nature. He spends his time in the rural and urban forests and mountains of Romania. Originally from the Netherlands, Pieter has a bachelor in European Studies from Zuyd University (Maastricht, NL) and a master in Forest Ecosystem Management (Brasov, RO). Romania, his adoptive country, has inspired and fed into his curiosity to explore forests in urban and regional settings.*

*His work is geared towards raising awareness for nature as a local development tool. Working on the new masterplan of the industrial city of Ploiesti he has found that nature is much more present than expected. Urban greeneries are used for small scale agriculture and animal husbandry as well as blocking pollution from the oil refineries. Holistic policies and fully utilizing nature makes Ploiesti that much more resilient and pleasant to live, potentially kick-starting local development.*

*On the regional scale, Pieter hopes to make nature the prime development tool. Being an external advisor to the Regional Development Agency North-East he sees great potential in agro-forestry and bio-energy as a development tool for one of the poorest regions in Romania.*

efuf2016.gozdis.si

EFUF2016

@EFUrbanForestry

#EFUF2016

#EFUF2016 blog

SLOVENIAN FORESTRY INSTITUTE

City of Ljubljana

LJUBLJANA EUROPEAN GREEN CAPITAL

ZAVOD za GOZDOVE SLOVENIJE
Slovenia Forest Service

MUNICIPALITY OF CELJE

Employment Service of Slovenia

STIHL